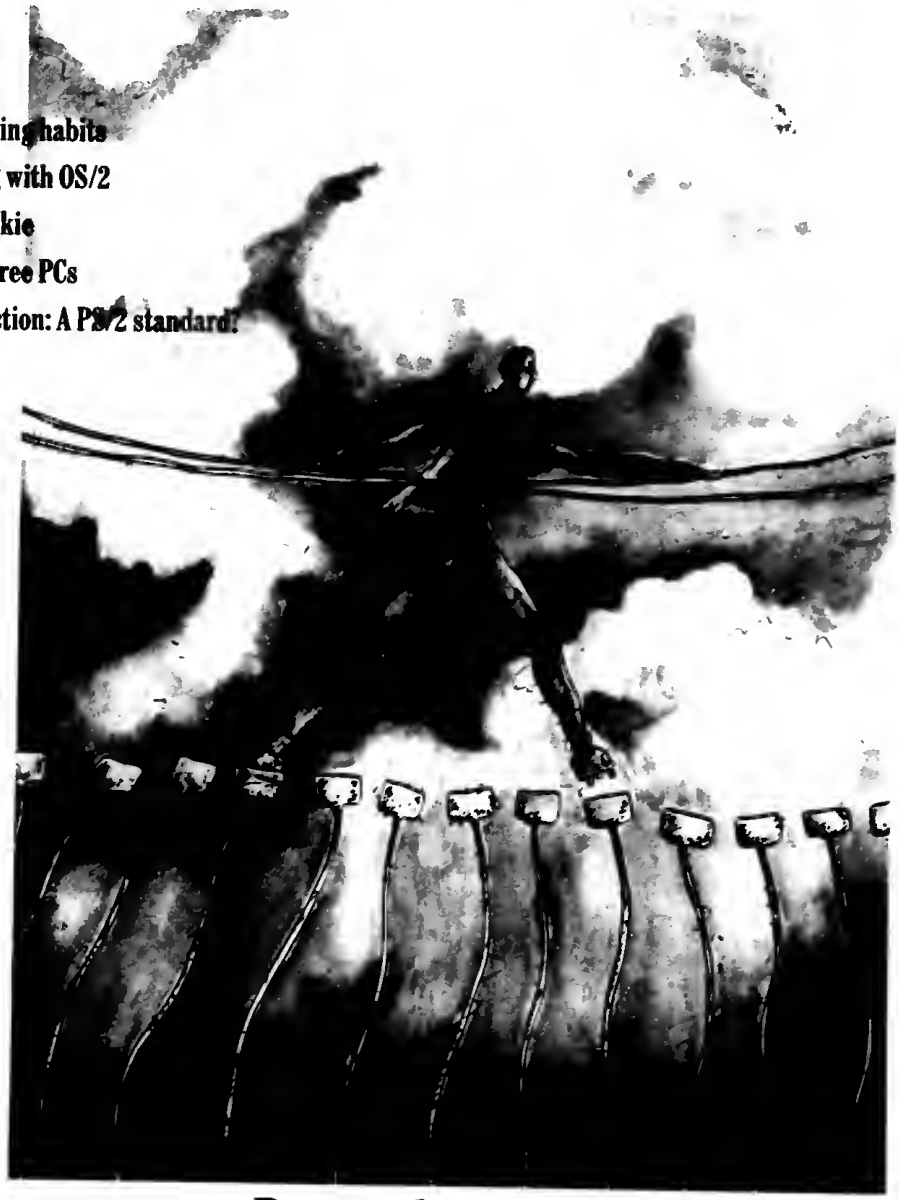
AUGUST 12, 1987
VOLUME 21, NUMBER 32A

COMPUTERWORLD

FOCUS

PC decisions in unsettled times

- Latest buying habits
- Competing with OS/2
- The PC junkie
- The Big Three PCs
- Special Section: A PS/2 standard?



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–PC Magazine, April 28, 1987

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You Guessed It.

in focus

IN THE MARKET FOR MICROS

The introduction of IBM's PS/2 microcomputers, the dropping price of IBM PCs and compatibles and the changing economic climate are forcing MIS managers to alter their buying habits. The greatest shift may well be toward the introduction of more compatibles into Fortune-class companies. By Avery Jenkins. Page 22.

BEDEVILED BY SYSTEM CHOICES

Deciding what PC system to buy has never been easy. And now IBM, Apple and DEC are making the selection more difficult. Their 32-bit offerings with optimized user interfaces all have their own unique blend of power and user-friendliness. See which system is right for you. By Michael Tucker. Page 25.

Help for the PC junkie

By Rebecca Hurst. Handling a PC power user is a tricky management task. Managers must refocus the user's energies away from being a technology guru for others and back to the business at hand. But dealing with the root of the problem — ensuring that MIS provides proper end-user support — may be a more monumental undertaking. Page 33.

Rivals fill OS/2 void

By Rebecca Hurst. As the industry ticks off the time until the arrival of IBM OS/2, users are looking for an operating system solution now. The answer may be in current MS-DOS enhancement products that effectively provide the same capabilities offered by OS/2. Page 19.

From the Editor

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Software productivity manager discusses the PC power game. Page 8.

PS/2 analysis

Will IBM's Personal System/2 Model 80 become a standard in microcomputing? While its hardware credentials are impressive, the machine may be dragged down by a lack of software — namely, OS/2. And clone vendors will surely try to usurp the newcomer's position. Against these odds it may take all of Big Blue's marketing strength to propel its newest machine to stardom. By Stan Kolodziej. Begins on page 29.

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COVER ILLUSTRATION BY KEVIN POPE

HAYES ANN
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We welcome letters to the editor and publish those we judge to be of interest to our readers. Letters should be addressed to the Editor, Computerworld Focus, 375 Cochituate Rd., Box 9171 Framingham, MA 01701-9171.

FROM THE EDITOR

A dog of a deal

Maybe its true that you can't teach an old dog new tricks. Once again, IBM is demanding unswerving loyalty from its customers by phasing out the Personal Computer AT and XT lines in favor of its new Personal System/2 family, products that leave many questions unanswered. Not all of corporate America, which has invested heavily in ATs and XTs, is pleased at being pressured to tread the Big Blue line toward a speculative future. Prior to the PS/2 debut, users were left to watch and wait, unsure of what to do. Unfortunately, months later, many are still wondering.

Part of the uncertainty stems from the confusion about whether IBM will support old products and for how long. Even if demand continues strong for the older PC line, the company has stated that it will "not build any more PCs." Although IBM maintains it is not abandoning the Personal Computer line and its customers because it will continue to support the installed base, many users remain skeptical as to what that support entails.

The initial PS/2 announcement and the phaseout clarification at a recent analysts' meeting in New York has left customers scurrying around looking for black-market ATs and XTs. Other buyers say they plan to continue purchasing from compatible and clone makers such as Compaq Computer Corp.

IBM is expected to undertake a considerable effort to wean its existing customer base from XTs and ATs to the PS/2s. Even though IBM claims that orders are exceeding expectations, a number of surveys have shown that users are not dropping everything to make the PS/2 move. According to a recent study by Framingham, Mass.-based market research firm International Data Corp., 40% of users questioned said they were less likely to change or were not changing existing buying plans at all after reviewing the details of the PS/2. These figures indicate that IBM users won't roll over and blindly follow the company's commands. By forcing the installed base to migrate to a largely unknown standard from an accepted one signifies that Big Blue does not yet realize that what's good for IBM is not necessarily good for its customers.

Ann Dooley

Reader makes move to find AT&T video

The article "Insider Crimes Threaten Corporate Well-Being" in the June 3 issue of *Computerworld Focus*, mentions an AT&T videotape called "It's Your Move."

I am very interested in viewing and/or purchasing the videotape. However, every attempt I have made has failed to locate the right resource in AT&T from which I can get the pertinent information. Can you please provide the name and phone number of the AT&T representative who is responsible for marketing the tape?

Norman Ching
Manager, Data Administration
Calfarm Insurance Co.
Sacramento, Calif.

[For information concerning the AT&T videotape, contact Mary Tiffany, 9333 John Young Pkwy. S., Orlando, Fla. 32819, or call 305-345-7565.]

A plan for all seasons: Course highlights need for backup

The June 3 issue of *Computerworld Focus* on security was very well done and greatly needed. In particular, the article on uptime management publicizes a critical area that few people understand. This topic generally only comes up when the foundation of disaster recovery planning needs to be constructed. What was missing from your issue, however, was a discussion of how risk analysis and quantification fit into the security picture.

A course that I designed and hope to teach in a local university deals with just that. The course can be useful in getting management to focus on the value and need for contingency planning.

Edwin B. Heinlein
Heinlein Associates, Inc.
San Rafael, Calif.

Quality is the selling point for implementing CASE tools

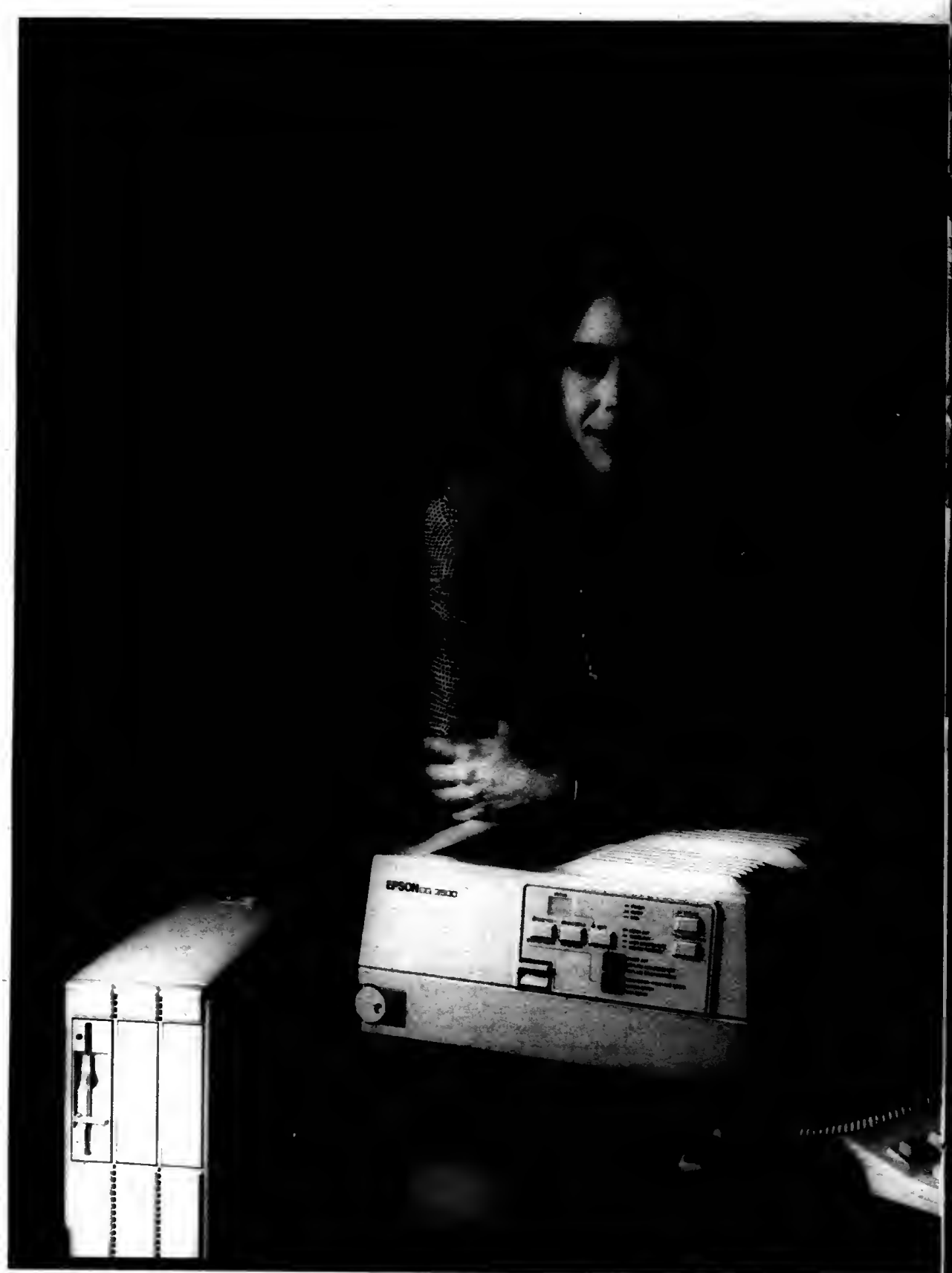
Having just completed your July 8 issue of *Computerworld Focus*, I'm enriched by the information and new perspectives the articles provide.

I am currently serving as a software engineering consultant to AT&T Bell Laboratories, where I am involved in both research and application of software life cycle methodologies and tools. From that vantage point, I was struck by the absence of the most compelling argument of all for the implementation of formal methodologies and computer-aided software engineering tools (CASE) — software quality.

As the author noted in the story entitled "It's a dirty job," software budgets for maintenance are approaching and even exceeding 50% of total MIS/DP expenditures. Analysis of cost and effort expended over the life of a software product clearly indicates a geometric relationship between the cost of maintenance (change) early in the life of the product vs. the cost of implementing those changes after deployment.

I realize that the topic of software productivity and quality is a complex one that encompasses a wide range of management and technological issues. However, I'm sure your readers would appreciate an update on state-of-the-art techniques available to alleviate the increasingly critical quality problems that threaten their credibility as managers and escalate their cost of service.

Victor Brown
Software Engineering Consultant
Dublin, Ohio



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VIEWPOINT

Q AND A

Jerrold Grochow

Power play: Software manager sees targeted use for new breed of PCs

Jerrold Grochow manages activities in the area of software productivity as part of the Corporate Technology Group at American Management Systems, Inc. (AMS), an Arlington, Va., software services and consulting firm. Grochow's team is responsible for the development and support of AMS's Life-Cycle Productivity System, an integrated set of productivity tools used through software life cycles.

Grochow recently spoke with *Computerworld Focus*'s Senior Editor Stan Kolodziej about IBM's PS/2 Model 80 microcomputer and the power game taking place in the microcomputing business.

Do you think users are really interested in the power of the new breed of personal computers such as IBM's PS/2 line?

What we're starting to see is the so-called power user in departments other than corporate engineering. People in accounting and marketing are using PCs to handle heavier statistical loads. Many accounting departments, for example, are starting to consolidate monthly sales results from subsidiaries on PCs. They use PCs because of the hands-on nature of the machine. They can also make last-minute adjustments and quickly rerun results. Those users are looking for faster PCs, and when they get data from the mainframe, they don't want to go back to the mainframe to run a statistical package. They want to keep it on the PC.

OS/2, IBM's operating system, will reportedly finally break the 640K-byte barrier. What will that mean to users?

I've found that in a lot of things the 640K-byte barrier is not as imposing as it is in other areas. Besides programmers, the people you hear complaining about the limits of the 640K barrier are those who are doing superlarge spreadsheets. The number of people doing spreadsheets that large isn't a great percentage of the population. Lotus Development Corp. has a million copies of 1-2-3 out there, and the company did a survey that indicated that only about 20% of those users actually do macros. I would expect that only a portion of those users, maybe 5% of the total user population, is even worrying about superlarge spreadsheets.

So for most single applications, the 640K barrier is still not a problem. But for multiuser, multitasking applications a little further down the road, breaking the 640K barrier is essential.

Some users I've spoken with are trying to find a good use for the Intel Corp. 80386-based PS/2 Model 80 when it becomes available later this year. The Model 80 will pack 16-MHz speed, a 32-bit processor and up to 230M bytes of storage. Is that too much power for the user community to absorb right away?

[That is too much power if used] as a single-user system. I think a lot of people are going to get a Model 80 to use it as a network server because there seems to be a fair amount of improvement in general network performance by just having a faster CPU on the network server. The Model 80 also gives an extremely high transfer rate to the disk. Both the Model 80's 70M-byte and 115M-byte disks have the new enhanced small device interface, which gives a much higher transfer rate.

Also, at about $11,000 for a fully configured Model 80, we're not about to buy many and put them on programmers' desks. We're buying IBM Personal Computer AT clones these days because the price is right. So I see the Model 80 as a network server with potential as a good multiuser system when OS/2 arrives. Of course, the way the industry works, the software is going to be late and the hardware price is going to come down faster than we think, so a year from now I may be saying something very different.

As a network server, will the Model 80 provide closer local-area network and mainframe ties?

Yes. You can buy software that allows your network server to provide a single gateway to the mainframe. So rather than having to buy a Digital Communications Associates, Inc. Irma card for every PC on your floor, you only need one Irma card on your gateway to the mainframe, and everyone on the network can go through that.

It also raises some interesting questions about what's going to happen to Digital Communications, because when people start channeling data through only one card, the company may find itself selling fewer Irma cards.

There is now, more than ever, the need for more horsepower on the network server. Intel has already announced experimental quantities of its "80486" processor, which will be a factor of two to four times faster than the 80386. I don't think the 386 is a true 32-bit machine, and I don't think Intel is going to change that in the 486. What they'll do is add speed.

I would also be very surprised if IBM hasn't already anticipated this [course of events]. The PS/2 Micro Channel bus was designed to allow coprocessor cards in a very easy way, so you're going to start seeing an 80486-based coprocessor in a few years.

What impact will the new PCs have on programming?

Until recently, we would do some design and analysis on PCs because of their good graphics capabilities and then shoot some information up to the mainframe to write code. But we're already seeing some fairly decent Cobol compilers running on PCs, so people are now saying they'll do their programming on the PC and then just do some testing on the mainframe.

The biggest problem in PC programming right now is the loss of centralized control. A typical project at AMS will involve from 10 to 50 people. If everyone is sitting at their PCs, not connected to each other, how are those people communicating? One group will say we should hook everyone together on local-area networks, but you still run into problems of how to share data, and the data base management systems on the PCs don't really deal with distributed data bases. There are also the problems of locking and access control.

Others are in the same dilemma, but I don't think these are insurmountable problems. If we can figure out exactly what we want to do conceptually, we'll find the technical solution.

MANAGER'S CORNER

Industry merger fever

Jim Young

Nowadays, MIS must not only be alert to product announcements, price changes, service programs and other vendor news, but it must also track the changes wrought by mergers and acquisitions. These conditions cause a great deal of confusion for high-tech consumers.

Mergers and acquisitions are not new phenomena in the computer industry. In the late 1970s and early 1980s, there was a lot of high-tech trading. Much of the activity then was by nontechnical corporations wishing to add computer-related companies to their empires.

Today, computer merger activity seems to be predominantly high-tech companies acquiring each other. While this trend may result in more technologically knowledgeable management teams than could be found in the mergers of the '70s and early '80s, it likely will not foster a hands-off approach toward existing operations.

Though there is not much the typical MIS manager can do to influence the destiny of vendor marriages, he can react more intelligently to potential or implemented unions if he analyzes the situation carefully.

By examining market impact, an MIS manager can more accurately judge whether he can place his group in a position to benefit from a burgeoning success story or distance itself from an impending failure. To assess a merger's prospects of success, MIS should consider the following issues:

- What is the reason for the merger?

Is one party in difficulty? Will a company improve its financial weakness, such as a debt, or will it disguise a poor financial performance? Is the merger a situation of reinforcing overlapping products and services, or will the companies join complementary areas? Does the merger provide geographical expansion, additional or alternate channels of distribution, vertical integration or technical skills?

Managers should analyze these areas as an existing or potential buyer of goods and services. In a worst-case scenario, a newly merged or acquired company may create a virtual stranglehold on the market. As a customer, MIS may fear the resultant reductions in service levels, product introductions and attention as well as unwelcome price increases that typically accompany a business monopoly. A far more desirable situation would be the creation of a firm that can provide its customers important services and products.

- How are the companies implementing the merger?

If the merger is not a pairing of equals or even complementary partners, beware of the impact on the acquiree. A weaker unit could be swallowed up.

Financial considerations can also have a serious impact. For example, does an acquisition cause a cash drain that the company will pay for with major expense reductions? Observe how customers are treated during the proceedings. Does the company keep them honestly informed or does it ignore them? Does the merger plan call for a major restructuring, or will it maintain existing organizational compartmentation?

- What is the new company's direction?

Will the company continue to concentrate on and support the products and services in which you are interested? Will it overcommit in other areas, possibly abandoning important offerings along the way? Despite the firm's stated strategy, does it have the resources to carry out its plans? Is the organization strongly positioned against competition?

Fresh initiatives may bring new products or services to customers. Sheer size may bring more support. However, just as often, existing customers are abandoned in the frenzy of new opportunities. Experienced MIS managers know that size and capabilities are not nearly as important as consistent mutual interests.

In their evaluations, managers should be critical and skeptical of mergers that affect their vendors. Count on change. Whether it is tighter management, redirected marketing strategies, new or consolidated product lines or the removal of nonchargeable services, a merger can be bad news for MIS. With time and money at stake, it is not enough just to listen to industry pundits and the vendors that are involved in a merger. MIS managers must form their own, unbiased and informed opinions based on professional insights and professed intentions.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes in Hartford, Conn.

news & analysis

UPDATE

Execs work, play on PCs

All work and no play? Evidently, that is not the scenario for a majority of executives who use personal computers at the office for more than just business.

A recent survey of 750 executives with titles of vice-president or higher revealed that 66% use their computers for non-work-related purposes. The poll was conducted by New York-based G. S. Schwartz and Co. for Epyx, Inc., a Redwood City, Calif., PC entertainment software developer to determine how executives integrate computers into their workday.

Among executives who use office computers for other activities, 74% write personal letters, 57% play computer games and 33% balance their checkbooks. The survey also indicated that 20% of the respondents write resumes, 35% help family and friends with work, and 18% do schoolwork using office microcomputers, minicomputers or mainframes.

The majority of executives (71%) spend 15 minutes or less per day using office computers for personal business. Another 23% devote between 30 minutes and 2 hours to using the computer, and 6% of the users spend more than 2 hours per day. While 34% of the respondents said they use the office computer during office hours, 82% reported that they stay after hours to do non-work-related personal computing.

Corporate management can take a few cues from these survey reports, says Naomi Karten, president of Karten Associates, a Randolph, Mass.-based management consulting firm. First, she notes, although the study includes only executives, their responses probably reflect usage trends among other employees.

Second, the personal use of computers is a good sign at this stage, Karten asserts. "The first step in getting people to use computers for good business purposes is just getting them to use them," she says. Also, allowing users to take advantage of office computers during off-hours does not really cost the company, she comments.

However, Karten advises that personal use of office computers should not jeopardize data integrity or computer security or interfere with business.

C language gains in popularity for development

Developers and users may still debate the merits of the Microsoft Corp. MS-DOS and Unix operating systems, but for many others, C is the language of choice. "C is the biggest thing to come out of Unix," says Paul Cubbage, a senior industry analyst for San Jose, Calif., consulting firm Dataquest, Inc. Almost all MS-DOS application vendors have shifted to C as their development language, he claims. Many systems integrators and value-added resellers are beginning to shift from Basic and Cobol to C, he adds.

With C's popularity in the professional developer market, two vendors have begun a battle for the end-user market. Borland International, Inc. began by introducing Turbo C in January. At $99.95, Turbo C offers a lot of functionality at a low cost, Cubbage notes. In June, Microsoft responded with its Quick C language package, which offers similar performance for the same price.

C's popularity stems from a combination of factors, according to Cubbage. A large number of leading universities are turning out students trained in Unix and C, he says. Also, C has constructs that make it convenient for programming. "Theoretically, C is not as good as Pascal," Cubbage comments. "However, in practice, it allows programmers to do what they want."

Apple marketing gaffe will not hurt Macintosh II

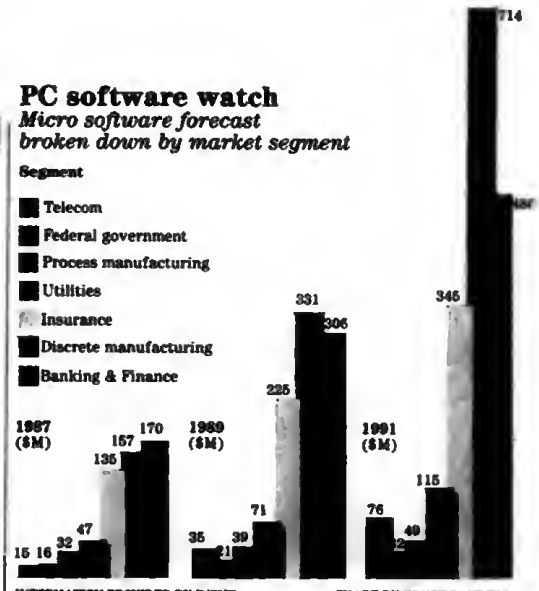
Apple Computer, Inc.'s Macintosh II, dubbed the Open Mac, has faced some compatibility problems with current Macintosh applications. However, these problems will not hurt the microcomputer's credibility as an office machine, predicts Robert Clarke, vice-president of marketing for The Seybold Group, Inc., a consulting firm located in San Jose, Calif.

Although a majority of applications for the Mac can run on the Mac II, a number of Apple

Continued on page 16

PC software watch

Micro software forecast broken down by market segment



IBM pitches a 3½-in. data storage curveball

PS/2 floppy-disk conversion troubles users

When IBM introduced the Personal System/2, it threw users a data storage curveball. The PS/2 machines sport a 3½-in. floppy disk rather than the previously standard 5¼-in. format.

Few observers were surprised by the format change. Technical advantages, including the toughness of the 3½-in. disk's semirigid medium, made the move inevitable.

Although it was expected, this change in size is a problem for MIS officers, who must now somehow convert their existing personal computer applications to a 3½-in.-drive format. A recent survey by International Data Corp., a market research firm in Framingham, Mass., revealed that 3½-in. disk drives rated near the top of the PS/2's features that MIS most disliked.

"When I realized the PS/2 didn't have a 5¼-in. drive, naturally, my first concern was the conversion process," notes Terri Wolford, data processing manager at Checker Motors Corp., an automobile manufacturer located in Kalamazoo, Mich. "I was afraid that conversion would be difficult or costly — or both."

Conversion facilities available from third parties have mostly dispelled Wolford's fears. But the experience has given her misgivings about IBM. "I don't think IBM did its homework up front. It should have done something to support its existing users, rather than just improving the technology," she says.

Perhaps because it is an improved technology, the 3½-in. disks seem to be catching on. Phil Devin, senior analyst on data storage at San Jose, Calif.-based market research firm Dataquest, Inc., notes that "in spite of everything, this is the age of the 3½-in. disk." For instance, he points out that a smaller size, coupled with greater storage capacity, makes the 3½-in. disks a natural winner. "[The 3½-in. format] is a fact of life," he claims.

What does the hot superconductivity field mean for computers? Page 14

However, Devin does not think the 3½-in. media is any more eternal than was the 5¼-in. disk. He argues that storage media display a predictable life cycle averaging about seven years. Devin used that cycle to predict that 3½-in. drives would start being shipped in large

Continued on page 14

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Superconductors: Hot times for a cool technology

Superconductors may soon be as common as semiconductors. Once merely a laboratory curiosity, a host of new, relatively inexpensive superconducting materials has come into being during the last year. The materials are certain to be used in future computers.

Superconductivity is the ability of some materials to carry electric current with little or no resistance. The applications of such materials in electrical design and electronics are virtually limitless. An electromagnet made of superconductive cable, for instance, would be vastly more powerful than a conventional electromagnet and would require far less energy to work. Theorists have suggested that electric motors using such magnets might prove a serious rival to the internal combustion engine in the automobile.

Superconductive circuits, meanwhile, could work much faster than those built of normal materials; computers built using superconductive devices would be faster.

Until recently, the only known superconductors were certain metals cooled to temperatures approaching absolute zero. The only known way of making a device superconductive was to submerge it in a liquid helium bath.

However, that restriction began to change late last year when J. Georg Bednorz and K. Alex Mueller at IBM's research center in Zurich announced the discovery of a class of oxides that were superconductive at a "warm" -98 degrees Kelvin (-283° F).

This discovery touched off an international research race. As of this summer, scientists were reporting superconductivity near -90° K, or roughly the temperature of liquid nitrogen.

Meanwhile, some theorists are beginning to talk about room-temperature superconductors.

But, even if room-temperature superconductors prove impossible, those that function in the -90° K range could easily be adapted to computer technology. Some supercomputers already cool their silicon components with liquid nitrogen.

The question then is not *if* but *how* superconductors will be used in computers. One possibility is that superconductors could be used as an alternative to conventional silicon transistors. For some years, researchers have talked about building computers out of Josephson junctions, superconductive switches that can turn on and off faster than conventional transistors.

IBM has experimented with Josephson technology, but abandoned it early this decade. Despite the success of its own staff in Zurich with superconductive materials, IBM says it does not intend to resume work on superconductive switches.

Gerald Present, senior communications specialist at IBM's T. J. Watson Research Center in Yorktown Heights, N.Y., argues that conventional silicon chips work so well that Josephson junctions would provide only a small advantage. However, "One of the first things that superconductive materials might be used for in computing is in interconnect wiring. It is more likely to show up there than as a switching device, if for no other reason than we know how to build wiring out of the material," Present notes.

And Josephson junctions continue to have their fans. When IBM abandoned Josephson technology, it also lost one of its chief researchers, Sadeg Faris, who left the company in 1983 to found Hypres, Inc., in Elmsford, N.Y. Shortly thereafter, Hypres introduced a line of laboratory test equipment based on Josephson technology — one of the first commercial uses of superconductivity.

Hypres rapidly became the leader of the fledgling U.S. superconductive industry and has, in fact, drawn contracts from both government and private organizations. — MT

Curveball

Continued from page 9

quantities by 1986 to 1987. "But they will peak," he says, "sometime about 1992."

What will replace the 3½-in. disk? "Some sort of integrated circuit memory card," Devin predicts.

He envisions a solid-state memory device about the size of a credit card that would plug into a computer in much the same way that floppy disks do.

He notes that some organizations are already offering integrated circuit cards with 256K bytes of memory and that cards with 2M bytes of memory are clearly on the horizon. — MT

Correction

In "Minis get Unix mainframe link" (*CW Focus*, July 8), the price of Unisoft Corp.'s 9750 CU/X communications controller should have read $70,000.

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Update

Continued from page 9

packages, including Macwrite, Macpaint and Macterminal as well as some third-party applications, cannot. Such compatibility problems are not unusual for a firm as large as Apple, but "it was a mistake to release the Mac II without addressing the compatibility issues," Clarke says.

Apple should have released more Mac IIs to software developers and held seminars so developers could modify their applications for the Mac II, Clarke says. Instead, Apple released its first models to the press. "The journalists found they couldn't run their favorite applications, and the software developers complained that they couldn't get Mac IIs to work with," he says. The bad press has caused marketing heads to roll, Clarke adds.

Apple has now solved the problem by getting the Mac II to developers.

Apple's marketing gaffe "ultimately will have little affect on the Mac II's success," Clarke predicts. Although the Mac II's compatibility problems are giving IBM's Personal System/2 an opportunity to catch up, the Mac II's problems are likely to be solved in the next several months. At that time, the PS/2 will begin facing similar compatibility problems with the availability of OS/2, Clarke says.

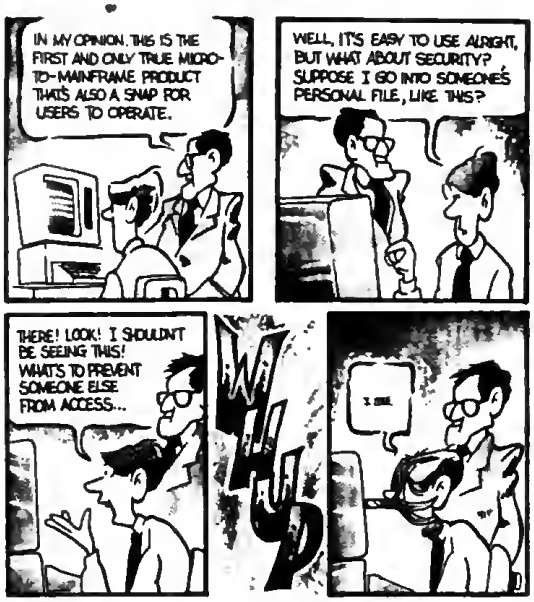
Survey: Corporate managers attend shows with intent to buy

With the computer slump waning, corporate managers are attending computer shows with the intent to buy. For example, 83% of the corporate volume buyers who attended the 1986 PC Expo in New York reported that they purchased information processing products. This finding was reported in a survey of 104 attendees by Exhibit Surveys, Inc. Among these buyers, 75% reported that the show influenced their purchases.

Purchases by 59 of the 104 corporate buyers totaled $16.3 million and averaged $276,970, the survey reports. Using this average, the research firm projects that the product expenditures by the 8,338 corporate buyers at the show came to $208.8 million. Of the responding buyers, 64% represented nonmanufacturing industries. Approximately two-thirds came from management and administration (33%) or DP (34%). — RH

dB

By Rich Tennant



PS/2 legal issues may hurt clone makers

IBM has done some aggressive posturing lately toward those who would recreate the new line of IBM Personal Computers in their own image — namely, PC compatible and clone makers. One of the most outspoken IBM executives is William Lowe, president of IBM's Entry Systems Division, who has publicly stated that IBM will take "appropriate measures to prevent people from copying patented technology."

Euphemisms aside, you can interpret that statement to mean that IBM intends to take to court anyone who tries to duplicate and sell the patented and patent-pending architecture of IBM's Personal System/2 microcomputers.

A legal battle would not surprise John C. Yates, attorney and partner in the Atlanta law offices of Vaughan, Roach, Davis, Birch and Murphy.

"I remember the old days when IBM went after Eagle Computer, Inc. and Columbia Data Products, Inc., two compatible makers," Yates says. "IBM also became aggressive in defending its computer BIOS after the Apple Computer, Inc. and Franklin Computer Corp. decision, which declared that computer object code could be copyrighted. That was a precedent-setting decision and opened a lot of ground for IBM and other companies to go after people whom they felt were violating computer copyrights."

IBM, however, isn't showing all its cards just yet. Yates says IBM has been sketchy about exactly what components in the PS/2 line are going to be patent protected. That is especially true with the PS/2 Model 80, IBM's Intel Corp. 80386-based micro. IBM claims the machine contains up to 80% proprietary hardware and software components.

"IBM's aim is directed at the PC cloners, not the add-in board people," explains Steve Urbanski, design engineer at PC Technologies, Inc., an Ann Arbor, Mich., maker of PC accelerator boards. "I'd be worried if I were a cloner."

Clone makers remain defiant

Nevertheless, most of the clone and compatible makers remain defiant.

Michael Dell, president of Austin, Texas-based PC's Limited, one of the first companies to introduce an 80386-based machine, says he is doubtful of the success of the PS/2 line anyway.

That sentiment is echoed by Compaq Computer Corp. President Rod Canion, who says the PS/2 line and architecture are an unnecessary burden on IBM users who might not want to convert to the machines. Canion is hedging his bets, however, by adding that he will produce PS/2 compatibles if Compaq's users want them.

In fact, sources say that Compaq already has its engineering and manufacturing departments churning out PS/2 clones, waiting until the muddy legal waters clear before jumping in. "It's no accident, after all, that one of the top-ranking officials at Compaq used to be one of IBM's patent attorneys," Yates concludes. — SK

NEWS & ANALYSIS

Users applaud IBM's graphics moves

IBM's Video Graphics Array (VGA) is a step in the right direction, according to users. The VGA, a built-in graphics capability in IBM's Personal System/2 Models 50, 60 and 80, contains 256K bytes of random-access memory, enabling the user to work with 16 colors in 640 by 480 dot/in. resolution or 256 colors in 320 by 200 dot/in. resolution format.

VGA replaces IBM's Color Graphics Adapter and Enhanced Graphics Adapter cards, which offer limited resolution and color selection.

Adding more punch to VGA is IBM's top-of-the-line 16-in. color display monitor that can paint up to 1,024 dot/in. by 768 dot/in. resolution on its screen.

Windows 2.0 — or Presentation Manager, as IBM refers to it — reportedly will be bundled into the OS/2 operating system and is a long overdue nod by IBM in accepting graphics and graphical program interfaces as key facets of business computing.

Still not as good as Apple

"I agree that VGA is an important step for IBM and a big improvement over its previous graphics," explains Donald K. Hsu, a marketing consultant with SJ Development Co. in Fort Lee, N.J. "Though it's still not as good as Apple Computer, Inc. Macintosh graphics, it's better than before. The only problem is that there is no software to take advantage of the VGA, and there probably won't be for another two years. Now it's just something sitting there outside a user's reach."

Dave Dickens, senior information processing consultant at the University of Wisconsin-Madison, says he is a little frustrated by the software delay but indicates the wait will be worth it.

"I think a lot of people are going to take advantage of the new graphics," Dickens says. "Our marketing and accounting people will use it for statistical charts, and it's going to open up new applications. We're getting a PS/2 Model 80 in for evaluation, and I can see both our business school faculty and grant students using the graphics to create new programs, such as real estate demographics, that they could maybe spin off into the local marketplace."

Gene Masshardt, director of computing services at the university, adds that the graphics will complement the extra power of the 32-bit Model 80 for statistical use. "We can always use the extra speed and graphics," Masshardt explains, "and I'm sure a lot of other users will feel the same." — SK

Optical drive market picks up momentum

IBM PC optical drive debut pressuring other vendors to drop prices

The market for 5¼-in. optical disk drives, though still small, is starting to develop into a price war.

"IBM's announcement of its personal computer optical disk drive is putting pressure on other disk vendors to drop their prices," explains Jay Bretzmann, a marketing analyst at International Data Corp. (IDC), a research firm in Framingham, Mass. The IDC researcher also says media prices are dropping. Double-sided optical disks can be had for $125, and single-sided disks cost half that amount.

IBM claims to have an order backlog of 40,000 for its recently announced 3363 Optical Disk Drive, which uses a small, removable disk that can store up to 200M bytes. The drive is an internal option for the IBM Personal System/2 Models 60 and 80 and an external option for Models 30 and 50.

Although 8-in. optical disks on larger, dedicated optical disk systems can carry 750M bytes of data storage, Bretzmann says that there is generally nothing with more than 500M bytes on the disks' smaller, 5¼-in. cousins. Most disks' capacity falls between 200M bytes and 500M bytes, he says.

"IBM is selling its optical drives for $2,950, and I think at least one optical disk drive vendor will try and push its drives to less than $1,000 next year," Bretzmann maintains.

Hopefully, the price cuts will help boost what Bretzmann classifies as a technology-driven, not demand-driven, market and will force vendors to look for users outside existing markets, such as the federal government.

Bretzmann says there was only a total of 3,200 5¼-in. optical drives sold in the U.S. in 1986, primarily from such U.S. companies as Information Storage, Inc. and Optotech, Inc., both located in Colorado Springs. Yet that amount was up from a paltry 550 drives in 1985, the first year the 5¼-in. drives were introduced. IDC predicts 5,000 to 6,000 drives will be sold this year, but the big year should be 1988 when the Japanese, represented by companies such as Ricoh Corp. and Toshiba Ltd., up the marketing ante with several systems.

Erasable optical disks

Help for the market may also be coming from technology that will enable users to erase and use optical disks again, an existing trait of hard and floppy computer disks. Currently, optical disks can only be written to or be recorded on once with write-once read-many technology. This limitation may be what has put an early drag on the optical disk market, some analysts say.

The race to perfect erasable optical disks involves many corporations and several different kinds of technologies, but the front-runners seem to be Japan's Matsushita Electric Industrial Co. and IBM, which have explored a technology called "phase change" to come close to producing erasable optical disks.

Matsushita has already made the 3363 optical drive for the IBM PS/2s, and, observers say, it is no coincidence that the drives can be converted to operate with erasable optical disks.

Many analysts predict that IBM will soon roll out its own personal computer erasable optical disk system. — SK

Impact printers losing to laser

The daisywheel printer that faithfully produced typewriter-quality text is losing ground to its flashy cousin, the laser printer. Behind this push is another upstart, the personal computer.

"As users gain the ability to manipulate both text and graphics on their PCs, they are demanding a wide font variety that you just can't get with an impact printer," explains Catherine Dingman, an associate director for Marshfield, Mass.-based publishing research firm CAP International, Inc. As a result, CAP projects that sales of daisywheel-type printers will fall from 660,000 in 1985 to 380,000 in 1990.

By contrast, sales of laser printers in what CAP calls the "workstation and office cluster categories" are expected to grow rapidly. The number of workstation-level printers sold will grow from 19.5 million in 1985 to 119.5 million in 1991, according to CAP. Laser printers falling under the workstation heading print up to 5,000 pages per month at a rate of up to 10 pages per minute.

The number of office cluster-level laser printers sold should nearly double from 1.3 million in 1985 to 21.5 million in 1991. Machines that qualify as office cluster laser printers print between 5,000 to 100,000 pages per month at a rate of 10 to 35 pages per minute. In addition, these printers also provide paper-handling capabilities such as large input and output bins and double-sided printing. — RH

Chip showdown

In the territory where the lines between 32-bit workstations and personal computers begin to overlap, the Intel Corp. 80386 is heating up competition. Still, no one has had to leave the showdown. "There is absolutely room enough for both technologies," says John Logan, a senior analyst for The Yankee Group, a Boston-based consulting firm.

Today, 32-bit workstations, generally based on the Motorola, Inc. 68020, can count among their chief rivals PCs using the 16-bit Intel 80286 chip. "The 286-based computers are having a major impact on the lower end of such marketplaces as electrical engineering, computer-aided design and computer-aided engineering," Logan reports.

However, these 286 machines are not vanilla personal computers. "These computers are highly modified. They may have 1M byte of random-access memory, a floating-point accelerator and high-resolution graphics," Logan notes. As a result, the heavily equipped 286-based workstations are much more expensive than standard PCs. "These workstations are equal in cost to low-end 32-bit workstations," he says.

Despite the similar cost, many users opt for the 286 workstation because they feel it is a safer investment, Logan says. "If the 286 PC does not work out as a technical workstation, managers know they can use the PC somewhere else in the firm to run other Microsoft Corp. MS-DOS-based applications," he says. The 68020-based workstations generally cannot run the MS-DOS packages that the 286 PCs can.

Reacting to these 286-based machines, 32-bit workstation vendors have dropped the prices on their lower end systems. Sun Microsystems, Inc. began in April by lowering the cost of its 68020-based, entry-level Sun-3/50 from $7,995 to $4,955. The 3/50 includes a 19-in. monochrome monitor, 4M bytes of memory and built-in Ethernet.

Apollo Computer, Inc.'a pricing strategy centers on its 68020-based Domain Series 3000 personal workstations, which feature 4M bytes of memory, IBM Personal Computer-compatible bus and floating-point coprocessor. A recently introduced entry-level model with a 15-in. monochrome monitor costs $4,990. The older entry-level system with a 19-in. monochrome monitor has been reduced from $9,990 to $5,990.

DEC follows suit

Similarly, Digital Equipment Corp. has announced that it will cut the price of its Vaxstation 2000 with a 19-in. monitor from $10,500 to $5,400. The company also stated that in December it will introduce two competitively priced systems. A monochrome workstation reportedly will cost $4,600, and a color Vaxstation will sell for $7,900.

These pricing strategies will help differentiate the 68020 workstations, which offer low-cost 32-bit technology, large amounts of usable memory, multitasking and multiple user support through the Unix operating system. However, these distinctions will blur with the availability of IBM's 386-based Personal System/2 computers running the OS/2 operating system. "Together, PS/2 and OS/2 will give users large amounts of real memory and high-resolution graphics support," Logan says.

The Intel 80386, a 32-bit processor, provides capabilities similar to those of the 68020, making the two chips equally viable, Logan notes. Already, Sequent Computer Systems, Inc. has replaced the 68020 processors in its Balance series computers with 80386 processors. Sequent was able to make this switch because it uses a vanilla version of Unix and an industry-standard bus architecture, he says.

Other companies lack Sequent's flexibility, however. "A majority of vendors have developed a full line of software and tools around a hardware platform. They would have problems switching to a new processor," Logan claims.

Ultimately, these chip debates, critical to vendors, will have little effect on users, Logan notes. "Users are buying workstations for the applications that run on them, not for the hardware platform below." — RH

News section compiled by *Computerworld Focus* staff members Stan Kolodniej, Michael Tucker and Rebecca Hurst.

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Rivals fill OS/2 void

BY REBECCA HURST

OS/2 is the future salvation for frustrated MS-DOS users. At least, that is what Microsoft Corp., developer of the OS/2 and MS-DOS operating systems, and IBM, an advisor on OS/2 development, are telling the personal computer user population.

Yet the fact that the companies are proposing OS/2 as a future solution poses a problem for many PC users who need more than MS-DOS can offer today. OS/2 will not be available until 1988, and the first OS/2-based applications are at least 18 months away. Even then, some users may find that MS-DOS enhancement products more effectively provide the same capabilities offered by OS/2.

The biggest problem with OS/2 is that it is not here, says William Zachmann, vice-president of research for International Data Corp. (IDC), a Framingham, Mass.-based research firm. "If you commit to OS/2 today, you don't know what you're committing to." OS/2 is being developed in an atmosphere of creative tension between Microsoft and IBM, he explains. This tension could foster terrific results, or it could lead Microsoft to introduce a system that demands a lot of resources, Zachmann says.

Availability concerns aside, the known OS/2 specifications raise questions about compatibility and performance. Applications written for OS/2 can go beyond MS-DOS's 640K-byte memory barrier and perform multitasking, but MS-DOS-based applications running under the MS-DOS 3.3 portion of OS/2 cannot.

Some current applications may not run under OS/2 at all, suggests Eugene Schklar, director of PC product marketing for Belmont, Calif.-based Oracle Corp. Software packages such as Lotus Development Corp. 1-2-3 sometimes bypass MS-DOS, he explains. When the products running under the MS-DOS portion of OS/2 try to escape MS-DOS, they can destroy the operating system, Schklar says. Therefore, users who want to run 1-2-3 on OS/2 will have to buy a new version designed for OS/2.

To fill the gaps left by OS/2, third-party vendors are offering their own improvements for MS-DOS. These products are designed to run multiple concurrent tasks, break the 640K-byte memory barrier or support multiple users. Many of the products are also designed to take advantage of the Intel Corp. 80386 processor. The number of these MS-DOS enhancements entering the market this year makes it difficult to list every product. However, by looking at the options available, users can choose the solutions that best meet their needs.

STEVE DENING

The best known MS-DOS multitasking product is the Desqview windowing program from Santa Monica, Calif.-based Quarterdeck Office Systems Co., says Dave Eden, president of the San Francisco PC Users Group. Desqview, available since 1985, allows users to load programs into different windows, which can then be run concurrently.

For example, another member of the San Francisco users group continually runs an electronic blackboard in a background window while working on an application in the active window, Eden notes. This active window can overlap other windows, or users can blow it up to full-screen size.

Eden has recently purchased the $99.95 Desqview package to get more mileage out of his IBM Personal Computer XT running MS-DOS 2.1. The version he uses, Desqview 1.3, supports up to nine windows. A newer version introduced in November 1986, Desqview 2.0, supports up to 256 windows, but Eden says that this number constitutes more windows than most people need. "Program developers may need to use all of them," he comments, "but I can't see using more than five or six."

To support multiple running applications, users generally add boards that support either the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) or the Enhanced Expanded Memory Specification, a superset of EMS, Eden says. These boards are available from such vendors as Irvine, Calif.-based AST Research, Inc. and Norcross, Ga.-based Quadram Corp.

Hurst is *Computerworld Focus*'s senior writer.

OS/2 ALTERNATIVES

However, users with Intel 80386-based machines do not need to add the boards because the 386's Intel 8086 virtual architecture provides capabilities similar to those of the EMS boards.

Desqview may provide more functionality than users who want only to switch easily between applications can use. Rather than a true multitasking product, these users may be better satisfied by a task-switching product such as Software Carousel from Manchester, N.H.-based Softlogic Solutions, Inc.

William Sprague, president of Computer Results, a consulting firm in Darien, Conn., made the switch from Desqview to Software Carousel. "I got Desqview with my AST Six Pak Plus [board package]," he recalls. However, he says, "The switching capability of Carousel is all I want. I have no need to run applications in the background."

Software Carousel costs $59.95. It uses approximately 70K bytes of random-access memory (RAM) and does not require EMS or an Enhanced EMS board, but many users choose to add the boards to handle several applications. Carousel allows users to store up to 10 programs. Only the program in the foreground can run while the others reside in the background.

Hot key to save steps

The advantage of the Softlogic product is that it saves users steps in moving between applications. Usually, a user has to exit the old document and then call up a new one. Software Carousel allows users to simply hit a hot key to move into another application, says Calvin Holt, Softlogic's vice-president of sales. When users return to a program, Software Carousel brings them back to the character or command at which they were when they exited the application, Holt adds.

For users who want true multitasking, Softlogic offers a product named Double DOS, which splits memory into two partitions that can run concurrently. The utility, available since 1984, is priced at $49.95. For even more functionality, users can add Software Carousel to either one or both partitions. This addition provides a platform for up to 20 applications that users can access with one or two keystrokes. Of course, from these 20, users can choose one from each partition to run simultaneously.

Another area in which MS-DOS products provide alternatives to OS/2 is adding RAM capacity for applications. Many of the products being introduced this year utilize the 80386 architecture and are designed as a platform for software applications. One product, Oracle's Professional Oracle, stands apart.

Professional Oracle is an MS-DOS 3.3-based data base management system that allows users writing or using DBMS applications to go beyond the 640K-byte memory barrier. Unlike other products in this category, though, it works on both the Intel 80286 and 80386 processors. To offer additional memory, Oracle has implemented a function it calls Protected Mode Executive, which allows applications to use the 16-bit protected-mode capability of the 80286. "We have a large installed base of users with 80286 machines," Oracle's Schklar explains. "We want to protect their hardware investment.

Professional Oracle protects users' software investments as well. First, it allows users to write applications in Oracle's DBMS language or third-generation languages such as Cobol. Most Fortune 500 companies have written their data base programs in Cobol, so they have a huge investment in Cobol applications and programmers, Schklar says. By using Professional Oracle on the PC, users can write applications that will work on both the PC and the mainframe because they are not limited by memory size or development language.

Second, applications written for the MS-DOS-based version of Professional Oracle will be able to run on OS/2. Because any applications written to the DBMS product are unaffected by the operating system below, the applications will be upwardly compatible with OS/2. After OS/2 becomes available, Oracle will release an OS/2 version of Professional at no cost to users who have a Professional Oracle maintenance contract.

> **"If you commit to OS/2 today, you don't know what you're committing to."**
>
> WILLIAM ZACHMANN
> INTERNATIONAL DATA CORP.

Geared to corporate users, Professional Oracle has been available since May and costs $1,295 for one copy. Oracle shipped almost 5,000 copies to Fortune 500 customers and value-added resellers in the DBMS product's first five weeks of availability.

The main line of enhanced memory capacity development centers on the 80386 processor's 32-bit protected mode. This mode allows the computer to run 32-bit data instructions, whereas the 8086 and 80286 only run 16-bit instructions. As a result, applications that can utilize the 80386 protected mode will execute faster. Also, the 80386 protected mode provides a 4G-byte linear address space. This allows applications to access all the memory they require without relying on memory-switching schemes.

There are two types of software products that form a platform for applications to take advantage of the 80386 32-bit

protected mode: MS-DOS extension software and language compilers. In addition to these products, the systems also need a linker, which combines relocatable object program modules, and an assembler for the 80386. Phar Lap Software, Inc. in Cambridge, .Mass., has currently cornered the market for these two items, according to David Fulton, president of Fox Software, Inc., in Perrysburg, Ohio.

MS-DOS extension software sits between MS-DOS and the application. Because MS-DOS only works in real mode, the extender gives the application the illusion that it is talking to a protected-mode operating system. Then, whenever the user or application issues a call to MS-DOS, the extender makes the application believe that it is switching to real mode. Two products based on this technology are 386/DOS-Extender from Phar Lap and VM/386 from Softguard Systems, Inc. of San Jose, Calif.

Requires recompiling for 386

The MS-DOS extension products will only work with applications that have been written in a third-generation language and have been recompiled to run on the 80386. To that end, three companies have begun offering 80386 compilers for languages running on MS-DOS. Language Processors, Inc. in Waltham, Mass., has compilers for Cobol, Fortran and Basic and will offer one for Pascal in late August. Santa Cruz, Calif.-based Metaware, Inc. is shipping C and Pascal compilers. Green Hills Software, Inc. of Glendale, Calif., is making C, Pascal and Fortran compilers available.

Reportedly, more than 300 software developers have been looking into these compilers and MS-DOS extenders, but only a few have introduced products. The most interested software vendors appear to be those offering computer-aided engineering or DBMS packages because of the amount of memory these applications require, says Richard Smith, president of Phar Lap. For example, Viewlogic Systems, Inc. in Marlboro, Mass., has rolled out an 80386 version of its Viewsim computer-aided engineering package that uses Phar Lap's 386/DOS-Extender.

Two DBMS vendors that have announced they are working on 80386 versions of their products are Fox Software and Belmont, Calif.-based Ansa Software. Fox began shipping a version of its Foxbase DBMS that works with Softguard's VM/386 in July. Ansa is investigating the use of Phar Lap's 386/DOS-Extender, says Richard Swartz, Ansa's vice-president of software development.

Given the ability to break the 640K-byte barrier and perform multitasking, the natural next step is to combine the two. Quarterdeck and Phar Lap are attempting to do just that. The two firms have signed a codevelopment pact to support Phar Lap's 386/DOS-Extender under Quarterdeck's Desqview multitasking windowing software. The vendors expect to release compatible versions of their products by the end of this year.

Another area of MS-DOS functionality that OS/2 does not attempt to address is multiuser support. For firms that want multiuser MS-DOS systems, the best solution is MS-DOS running as a task under the Unix operating system, IDC's Zachmann says. "MS-DOS under Unix is appealing because it is a flexible solution, and it's here today." As a result, the Unix-to-DOS options may take a big chunk of the potential OS/2 user market, he adds.

The two leading developers of Unix-to-DOS products that give MS-DOS multiuser functionality are two Santa Monica, Calif.-based firms: Locus Computing Corp., which created Merge 386, and Interactive Systems Corp., which codeveloped VP/IX with Phoenix Technologies Ltd. of Norwood, Mass. Both products are based on the same concept. MS-DOS and Unix co-reside on the same hardware, and MS-DOS is able to share Unix's multitasking, multiuser and unlimited memory capabilities by running under it as a task.

Before the 80386 was available, the MS-DOS portion of Unix-to-DOS products could not handle multiple users because the Intel architecture did not provide a workable hardware platform. With the 80386, Merge 386 and VP/IX take advantage of the processors' ability to run multiple virtual 8086 machines. Because each virtual machine only supports one user at a time, this system does not defy the rules defining MS-DOS as a single-user system.

Users unaware of Unix portion

Most importantly, the Unix aspect of the Unix-to-DOS products are invisible to users unless they decide to work with Unix-based applications.

Despite the functionality of the Unix-to-DOS products, users perceptions may limit their acceptance. "Most of the people who request Unix-to-DOS are Unix users who want to run MS-DOS," explains Martin Schwarz, president of LAN/Comm, Inc., a Cypress, Calif.-based consulting firm. "People who already have MS-DOS prefer a network that allows them to share 1-2-3."

These MS-DOS users will probably choose an OS/2-based network as the best solution, Schwarz predicts. The network operating system will provide the multiuser capabilities OS/2 lacks, and unlike a single multiuser machine, the network will support cooperative processing, he says. With the communications functions IBM plans to add to OS/2, Schwarz concludes, "OS/2's most important task will be getting business systems to communicate with one another." ✦

In the market for micros

BY AVERY JENKINS

Pressures from both inside and outside the corporation are forcing changes in the personal computer buying habits of MIS. The introduction of IBM's PS/2 line of microcomputers, the ever-dropping price of IBM Personal Computer XT and AT compatibles and changing economics are conspiring to force MIS managers to modify their PC purchasing plans.

Market researchers and MIS managers both say that microcomputer purchases will remain at about the same level this year as they were last year. But the nature of those purchases will likely change. More compatibles, traditionally spurned by Fortune 1,000 corporations, will find their way into these firms. However, those machines will likely not have the same uses as the PCs already existing in companies and will also be accounted for differently.

Until recently, corporate planners have applied the same justifications to microcomputer purchases as they have to mainframe ones. Cost-justification procedures were integral to the usual purchase approval process, including analyses of the computer's intended use and planned applications software. And, just as IBM has been the mainframe of choice for corporate data processing, MIS departments ensured that the micro world was true Blue as well.

"A few years ago, the corporate guys were still tied to IBM's apron strings," says Tim Bajarin, executive vice-president of Creative Strategies Research International in Santa Clara, Calif., a market research firm.

But two occurrences forced a change in MIS's outlook — the introduction of Compaq Computer Corp.'s IBM compatibles and the commoditization of the personal computer.

The success of Compaq's IBM compatibles in the corporate arena is well-known. Even in cases in which PC strategies called for IBM machines only, corporations turned to Compaq, first for its portable machines and later for its desktop workstations. Though Compaq never claimed 100% compatibility with IBM products, the 99% compatibility that Compaq's units provided proved to be close enough for most consumers.

This situation, in turn, opened the doors to a horde of IBM clones for the personal-use market. Few of the feared compatibility problems have cropped up — in fact, more compatibility complaints have been directed at IBM's line of computers than at the compatibles.

The competitive clone market then forced the price of microcomputers to drop. Two years ago, companies estimated their average PC workstation costs at approximately $10,000, including software, maintenance and support. However, that price has currently fallen to less than half that amount.

Part of the decrease has been the result of falling hardware and software prices, but it is also a result of increasing computer literacy on the part of users. More knowledgeable users means less support, a situation that reduces the cost of an overall PC installation.

Now, the PC is more of an appliance, Bajarin explains. Cheaper workstations are causing the loosening of strict purchasing procedures requiring maintenance contracts and other types of expensive support.

Jenkins is a Boston-based free-lance writer.

GEOFFREY O'CONNELL

PURCHASING PLANS

In some cases, firms are even discarding such support, according to Chris Whichard, managing director of Business Technology Research in Wellesley Hills, Mass.

Frills will disappear

Noting that a PC AT clone costs only a few thousand dollars, Whichard says a company is much less likely to be concerned with long-term viability. Because companies do not expect the machine to last and last, he explains, "frills," such as maintenance contracts, for inexpensive PCs will likely disappear altogether.

Another prospect for the cheap PC is in vertical, single-purpose applications, Whichard adds. Cost-justifying micro purchases has long involved proving the machines' value through manpower reductions or savings. This justification required the PC to be a general-purpose machine that firms could use for many different applications. However, as PC prices drop, it makes sense to buy the machines for a single purpose such as a data base project or desktop publishing.

Another of the traditional blocks preventing companies from purchasing IBM compatibles has been the hovering specter of communications. But now PC-compatible vendors are actually using communications to bolster their penetration of the market.

Connectivity, whether to a local-area network or a mainframe, is much more hardware dependent than other PC applications, and corporate PC managers have been reluctant to buy machines other than IBM for fear that a clone will be incompatible when it comes time to link it to other machines.

This fear has, until recently, slowed the introductions of non-IBM microcomputers. But in a quick reverse, connectivity is now forcing MIS to look harder at the clone market. Whichard says that the increased use of networks is devaluing the corporate microcomputer. "Putting [a micro] on a network, where it becomes a terminal-type device . . . [causes it] to become even more of a commodity," he explains. The use of a network also makes possible the diskless PC, which uses the network's file servers for its long-term storage and only provides local processing power.

At Land O' Lakes, Inc., an Arden Hills, Minn.-based agricultural cooperative, the ability to communicate with IBM mainframes was the overriding factor in a decision to switch from IBM to Wyse Technology, Inc. PC compatibles, says Michael McKeown, manager of user services.

McKeown recommended in April that Land O' Lakes make the switch to Wyse machines instead of IBM PCs partly because of price benefits and partly because of the good relationship between his company and a local retailer that would provide the Wyse PCs.

> **"Even if the PS/2 is a complete flop, it will still sell millions because it says IBM on it."**
>
> HARRY MCENERNY
> THIRD NATIONAL BANK

Beyond communications, price and goodwill, a major reason McKeown left the IBM fold was because of the PS/2.

"I don't think the PS/2 gives us anything," McKeown says. "It's a [Microsoft Corp.] MS-DOS-based machine, so it doesn't buy us anything beyond what we have got right now."

At the same time, if he bought the PS/2, he would lose the ability to communicate with his mainframe. While the Digital Communications Associates, Inc. and Tecmar, Inc. boards that Land O' Lakes uses to link its PCs and mainframes will work in the Wyse micros and other PCs, they do not work in the PS/2. In fact, no vendor currently makes a micro-to-mainframe board to fit the PS/2.

However, even though certain vendors are working to provide such boards, McKeown says he does not want to wait. The first versions of the micro-mainframe boards will likely have bugs in them, he claims, adding that it does not make sense for his firm to be a guinea pig for new hardware while it can use existing equipment that is largely hassle-free.

IBM is hampering the development of third-party boards for micro-to-mainframe links, according to Harry McEnerny, senior vice-president of office and personal computing for the Third National Bank in Nashville.

Third National is a holding company that owns several banks throughout Tennessee. Like Land O' Lakes, Third National uses its IBM Personal Computers to communicate with its corporate mainframes. McEnerny says IBM is being fairly frugal with the technical information necessary to develop these third-party link products.

Unlike McKeown, McEnerny is willing to wait a while. He has bought the PS/2 and plans to continue with the IBM line of microcomputers, but he says he is not entirely happy with that decision.

"We would prefer to not be tied to IBM as the sole supplier of these things," McEnerny explains. But because of the name, his firm will continue to buy Big Blue products. "Even if the PS/2 is a complete flop, it will still sell millions because it says IBM on it," he says.

While Third National has similar communications needs to Land O' Lakes', these needs are not as time critical.

McEnerny's organization can afford to bide its time, particularly because it currently has a surplus of PCs. This situation is not uncommon for companies that have pursued an aggressive PC purchasing strategy. These firms have met most of their critical PC-based needs, and new purchases represent either upgrades of older equipment or needs created by growth of the company.

McEnerny says Third National created its surplus through a consistent recycling policy. Micros that the company bought for specific needs have, in some cases, outlived the applications for which they were purchased. In other cases, the original equipment, such as a PC or PC XT, was replaced by an AT as the application grew in size and the user's dependency on it increased.

Rather than trading in these machines, which have already been written off by the company, McEnerny has kept them. When a need for PCs arises, McEnerny pulls a machine out of mothballs, upgrades it as needed and gives it to the user.

For example, Third National originally supplied XTs to its clerical staff for word processing. But the company found out that, in many cases, the typists were faster than the machines. Therefore, 18 months ago, the company equipped the clerical staff with ATs. Instead of dumping the XTs on the used computer market or trading them in for a discount on ATs, McEnerny installed the XTs in the financial department, where the analysts were less dependent on the microcomputers' speed.

Although some organizations, such as Third National, are forging ahead with their PS/2 purchases, other corporations claim it is too early to tell what effect the release of this machine will have on their acquisition plans.

The retail market indicates that PS/2 inventory has not been burning through stockrooms. Computerland retail stores are reporting that sales of the new machine are "sort of slow," in the words of one sales representative. Perhaps part of the PS/2's underwhelming sales can be attributed to the machine's applications dearth.

More than the mainframe or even the minicomputer market, micro purchasing is directly driven by applications. There are many non-application-related reasons for upgrading a mainframe or even a minicomputer. But, especially because the PS/2 lacks host communications capabilities, the major reason for buying it is the applications that it can provide.

Those applications are still few and far between. Although IBM has released an interim PC-DOS 3.3, the OS/2 operating system for PS/2 Models 50, 60 and 80 will not be available until the first quarter of 1988.

Beyond its immediate PS/2 functions, OS/2 is also the first product that will be available to support IBM's Systems Application Architecture, a common framework for applications development across the range of IBM products.

"The applications available are a very real part of PC sales," Whichard says, and with operating systems and software for the PS/2 yet to be seen, the reaction of buyers is likely to be guarded.

Land O' Lakes McKeown claims that it was not only the lack of software and an operating system that pushed his decision to go with the clones but also the PS/2's data storage format.

Equipped with 3½-in. disks, the PS/2 would require that the rest of the organization's PCs be similarly equipped for data compatibility, he explains. This format brings with it added expense as well as "a hassle," McKeown claims.

While MIS in many organizations waits to see what level of functionality the price of the PS/2 will buy, many others are not delaying the purchase of PC equipment. Many, like Land O' Lakes McKeown, continue to buy IBM compatibles to meet their firms' existing, urgent needs.

Will not reach dizzying heights

Although almost nobody expects the PC market to once again ascend to the dizzying heights it reached during 1983 and 1984, analysts expect it to grow at a moderate pace.

And if the PS/2 proves to be successful, it still is not expected to result in a sharp increase in overall market sales. Companies that have invested many thousands of dollars in their existing PC inventory will most likely engage in piecemeal upgrades to replace existing equipment that has become obsolete.

On the other hand, applications may be just the thing to spur a market resurgence. As applications filter into the corporation through new machines, other software will have to be replaced because "you want to get everybody in your company using the same level of application," Whichard says.

Those companies that can afford to wait as IBM prepares its products may find themselves rewarded in the long run. "It may be several years before IBM can supply us [with applications systems for the PS/2], but I think they are on the right track for the first time in the 25 years that I have worked with IBM equipment," McEnerny says.

"You don't learn to love it, but you learn to live with it," he concludes. ❖

Bedeviled by system choices

Selecting among IBM, Apple and DEC

BY MICHAEL TUCKER

At the end of last year and the beginning of this one, an entirely new breed of personal computer came into being. Machines that exploited 32-bit microprocessors and optimized user interfaces appeared almost overnight. Suddenly, the average executive had the power of a technical workstation at his fingertips.

The question facing MIS officers is how can they use these devices to improve both computing practice and their positions in organizations.

To get some idea where and how these PCs fit into commercial computing, *Focus* recently examined three vendors' offerings: the IBM PS/2, the Apple Computer, Inc. Macintosh SE and Macintosh II and the Digital Equipment Corp. Microvax 2000.

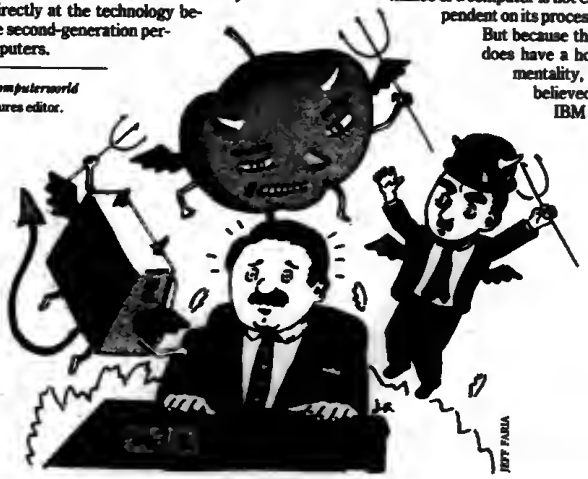
None of the three lines is currently available in great enough numbers to determine how end users will respond to the machines. However, the industry can learn much about the machines by looking directly at the technology behind these second-generation personal computers.

Tucker is *Computerworld Focus*'s features editor.

In terms of market expectations, the most important of the offerings is the IBM PS/2. When it was introduced in April, the machine ended nearly a year of fevered speculation on what IBM would do to top its Personal Computer products.

However, if the PS/2 ended speculation on IBM's future, then it also generated a host of questions regarding the future of the PC market as a whole. The industry expected the PS/2 line to be firmly based on 32-bit processors. That speculation may have been unfair because the performance of a computer is not entirely dependent on its processor.

But because the industry does have a horsepower mentality, people believed that IBM had to



PC COMPARISON

either produce an Intel Corp. 80386-based machine or abandon microcomputing to other firms, notably Compaq Computer Corp., that had already staked a claim on the 386 standard-making role.

In fact, the standard that IBM is now proposing is based on four machines — the PS/2 Models 30, 50, 60 and 80. To everyone's surprise, only the Model 80 is a 386 system. The Model 30 is a throwback to the venerable Intel 8086 processor. The Models 50 and 60, meanwhile, use the Intel 80286, similar to the Personal Computer AT.

This modest use of 32-bit processing, however, masks significant technical innovations elsewhere — innovations that could be far more important to MIS than processing power.

For instance, all but the Model 30 of the PS/2 line use 3½-in. disks and abandon the IBM PC bus for a sophisticated, high-speed bus, the Micro Channel.

OS/2 capabilities

In addition, most of the PS/2s can replace traditional Microsoft Corp. MS-DOS with OS/2, which was developed in association with Microsoft. In theory, OS/2 will eventually give the PS/2 multitasking and multiuser capabilities.

However, because software developers are only now starting to work with the system, no one knows yet what the operating system will mean.

What is clear about OS/2, however, is that it lends itself to friendly, graphically oriented user interfaces. This ability ties in neatly with PS/2 hardware, which is biased toward powerful graphics. All the PS/2s have incorporated graphics very large-scale integration chips on their motherboards. Also on those motherboards is a remarkable capability for connecting to IBM mainframes.

These developments prod some analysts to suggest that a new model of corporate computing is starting to take shape. In this model, users are shielded from the operation of even their local, desktop system by a graphically oriented, Macintosh-like interface. However, the system can easily access data in mainframes at the discretion of a central MIS department.

In effect, this model simultaneously extends computing power to and withdraws it from the end user. Because their desktop systems will be far easier to use, nontechnical end users will be able to get much more out of their systems. But because they will not have to struggle through the intricacies of MS-DOS or, worse, micro-to-mainframe packages, these users may be less of a threat to central data base operations.

In fact, software vendors are already designing products for that model. Ronald P. Kral, vice-president of strategic marketing for VM Software, Inc., in Reston, Va., says, "IBM has become increasingly aware that the end user has to be isolated from the operating environment."

The Mac challenge

But if the PS/2 generated the most market interest, Apple's machines — the Macintosh SE and Macintosh II — proved that neither IBM nor Intel can claim to be the only standard maker in PCs. Apple, and products based on the 32-bit Motorola, Inc. 68020 processor, still have a shot at the market.

Apple's Mac line is one of the great comeback stories of the 1980s. After virtually creating the PC market in the late 1970s, Apple flatly lost it. Widely publicized failures, such as Apple's Lisa small business computer, and the IBM PC's overwhelming presence made the company look like a has-been.

The first-generation Macintosh was part of the firm's troubles. When it first debuted, the machine was greeted with some amazement. Its mouse and icon-oriented interface were regarded as remarkable innovations.

However, relations between the industry and the Mac soon soured. The new Apple was friendly but slow. It had a superb interface but had few applications software packages compared with the mountain of applications building up around the

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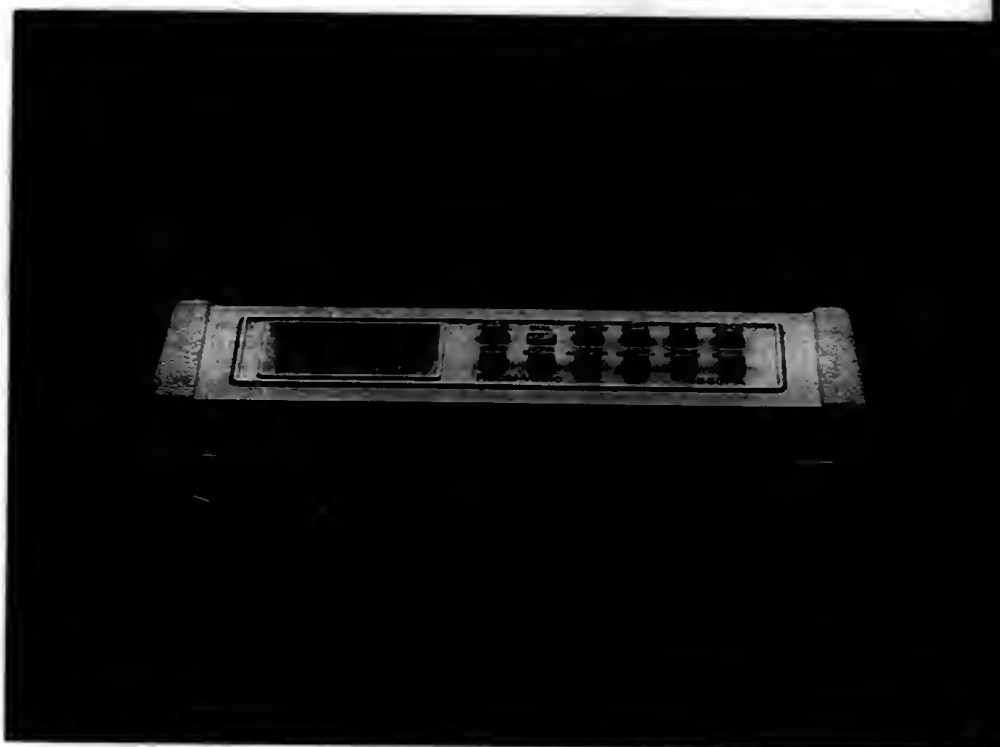

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IBM PC. It also lacked expansion slots and, therefore, could not partake of the boom in boards and peripherals that would make the PC the center of a multi-billion-dollar aftermarket.

Meanwhile, PC power users grew contemptuous of the Mac. They did not need the user-friendliness of the Mac's interface and found it restrictive. Because many such people were micro managers of large corporations, the commercial world rejected the Mac as well.

Apple's biggest problems, though, were largely invisible to the outside world. It is now clear that during the mid-1980s, a titantic contest was waged at Apple. On one side was Steve Jobs; on the other was Apple's current management team.

The Mac, like the Lisa, had been Jobs's protege. His opposition, meanwhile, was more closely associated with the Apple IIe, the machine that had made the company's fortune in the first place. Thus, when Jobs left Apple, some analysts suspected that the Mac would either be phased out, joining the Lisa in obscurity, or else be upgraded to an MS-DOS-compatible IIe with a mouse.

However, the Mac didn't disappear. For one thing, the Mac gained its own circle of die-hard fans who supported even the computer's first, unexpandable incarnation. For another, it wasn't entirely clear what Apple could have offered in place of the Mac. Even a 32-bit Apple IIe would be hard-pressed to oppose the IBM PC's market presence.

In any case, in March, just one month ahead of the IBM PS/2, Apple brought forth the Macintosh SE — which stands for System Expandable — and the Macintosh II.

The Mac SE is the smaller and less expensive of the two systems, priced at $2,898 for a basic configuration. It is also the most Mac-like, sporting the familar boxy footprint of the original Mac. However, the Mac SE differs from the elder system in that it has two floppy drives and a single expansion slot.

The Macintosh II is more like the IBM PC in appearance. It has a broad desktop chassis and a detachable monitor. Inside the chassis, the Mac II has a 32-bit Motorola 68020 processor, a floating-point arithmetic chip and six expansion slots. The machine costs between $3,000 and $5,000.

> **"It depends on what you're doing. If you need strong connectivity, then go with the PS/2. But, if you're oriented toward ease of use, then you're better off going with the Mac."**
>
> BILL KIRWIN
> THE GARTNER GROUP, INC.

Both machines have the famed, icon-based Mac interface, their single strongest point. According to Eric Arnum, editor of *Electronic Mail and Microsystems*, a publication produced by the market research firm International Resource Development, Inc., located in Norwalk, Conn., "The story with the Mac is the user interface. Obviously, Apple has gone far beyond IBM in making its interface easy to use."

But the two machines also have high degrees of mainframe connectivity. The Mac SE, like all Macintoshes, contains the Appletalk local-area network (LAN) as a standard feature. In addition, the Macintosh II has a small computer systems interface connector, two RS-422 serial ports and the Apple Desktop Bus, an interface for input peripherals.

But it is on the Macintosh II's bus that mainframe links get interesting. The Mac II contains the Nu-bus, a data channel device that was originally developed by university research. Like the old PC bus and unlike the Micro Channel architecture, the specs for the Nu-bus are public domain. Board makers, many of which are becoming nervous about IBM's delay in making Micro Channel data widely available, are turning to the Nu-bus as a new market for their wares.

One of the very first boards on display for the Nu-bus came from Apple at the Mac II introduction. The board included the Ethertalk card, an Ethernet interface for use with the Macintosh II under Apple's version of Unix, A/UX. Ethertalk is scheduled to ship in the third quarter of this year.

The presence of Ethertalk, in turn, means that the Macintosh II can exploit links to the VAX line of long-time Ethernet vendor, Digital Equipment Corp. Apple's move could be significant in that DEC has recently begun a major push into the MIS market.

Meanwhile, for the MIS shop in which "mainframe" means "IBM," the Apple machines still have potential. Opinion generally is divided on how connectable the new Macintoshes are, but the majority view is still that they can fit rather easily into IBM's Systems Network Architecture (SNA) universe.

"We are finding that the corporate data base standard is IBM," notes International Research Development's Arnum, "but now there is no penalty in presenting a Mac to the user and then, somewhere out of sight, linking that Mac into SNA."

Arnum argues that there is nothing to be gained by using a PC instead of a Mac. He says that the PS/2 is not yet a full participant in SNA and so for it, too, micro-to-mainframe links mean terminal emulation.

"Maybe the PS/2 is better at pretending to be a terminal than most workstations, but [it is] still only pretending to be a terminal," Arnum adds. "If it's doing that, it might as well present the friendliest interface it can." And that means the Mac.

Bill Kirwin, project director for personal computing at The Gartner Group, Inc. in Stamford, Conn., says he feels the Apple machines will play a major role as low-end scientific and engineering workstations. "As a general-purpose office automation workstation, we don't see the Mac II impacting the PS/2. And we see the Mac SE having only a niche market in office automation. We feel the installed base of application software will keep OA along the Intel path," Kirwin states.

He also says he believes that the PS/2 is more connectable to IBM mainframes than the Macintoshes will ever be. However, the interfaces of the machines are still key considerations. "It depends on what you're doing. If you need strong connectivity, then go with the PS/2. But, if you're oriented toward ease of use, then you're better off going with the Mac," he says.

In fact, Kirwin has begun to recommend to his corporate customers that they consider the Apple Mac II and Mac SE as secondary standards to IBM.

Beyond the Macintoshes and the PS/2s, there are other desktop machines, such as technical and engineering workstations, that people rarely associate with corporate computing. Will these machines still be key assets in the MIS world?

Enter the Microvax 2000

Consider DEC's Microvax 2000. Introduced in February, the 2000 is a Microvax II scaled down to a single-board machine and then installed in a system that is slightly smaller than a PC.

For $10,000, the 2000 delivers the Microvax II 32-bit, VAX-on-a-chip microprocessor, 4M bytes of memory, 42M bytes of disk storage and a software license for either the micro version of DEC's VMS operating system or Ultrix-32, DEC's version of Unix.

The Microvax 2000 is not being sold primarily as a single-user system. Rather, DEC notes that the 2000 will support up to four users by itself and up to 16 users on a LAN. In fact, if pressed, DEC will actually discourage buyers from selecting the 2000 over a Vaxstation if the applications they intend to perform with the machine are graphically oriented or highly interactive — both characteristics of PC applications.

So, machines like the 2000 are clearly not appropriate for nontechnical end users. But they could still have a role in MIS as the PC of MIS managers.

MIS officers have recently found a need for mainframe-like power on their desktop systems, which must also be highly connectable to their central systems. Increasingly, computer managers are undertaking tasks that are computer-intensive, such as extremely large-scale project management and remote software development.

In this case, machines like the Microvax 2000 have the potential to fit MIS's bill. Other players in the microcomputer game may be aiming at a similar market. For example, some observers have pointed out that the Model 80, the 386 version of the PS/2, is actually a VAX-like system. Perhaps it, too, is meant for the MIS department.

The workstation weapon

So, how should MIS react to the new generation of PCs?

The machines offer two things. First, they offer a chance finally and fully to extend computing to the end-user domain and, second, they do so in such a way as not to disrupt MIS's effectiveness.

According to Arnum, "From all the studies I've done, it is the user interface that has become the dominant issue in computing. That's where you expend your energy." And, he says, the function of that interface is not only to make the system easy to use but also to perform what are practically connectivity tasks. It allows the user to dip into corporate data bases without endangering the integrity of those bases.

The Apple and IBM machines can give MIS that sort of power. In fact, Arnum says of the PS/2, "It's designed for mainframe networks. I don't think it's really meant to a he a stand-alone personal computer."

This perspective would suggest that the entire generation of new PCs lends itself to the IBM model of corporate computing in which the use of the machines is kept as easy as possible, while users are removed from the operating environment.

In the process, MIS officers could actually improve their political positions if they become the most active promoters of the new systems within their firms.

"In a way, the new generation of PCs actually performs the tasks that people bought the first generation of PCs to do," notes Michael Packer, senior associate and codirector of the strategic information technology practice at the Mac Group, a consulting firm in Cambridge, Mass. "People bought PCs to ease their work load and gain control of their data only to find themselves trapped by training, application development and data entry problems. Now, by allowing access to mainframe data, the second-generation PCs could fulfill the promise of the first."

MIS managers can exploit this knowledge to their advantage. "If MIS can position itself so that it is viewed as the agency that makes that fulfillment possible," Packer claims, "then there could be a true detente between MIS and user communities." ◆

PS/2 ANALYSIS

RICHARD OBARA

IBM breaks from the pack

BY STAN KOLODZIEJ
SENIOR EDITOR

Has IBM created a new standard in corporate microcomputing with its Personal System/2 Model 80? IBM thinks so. Others are not so sure.

For the PS/2 Model 80 to become the microcomputer with which all other micros are compared, it will take everything the machine has to offer — hardware, software and, perhaps most important of all, IBM's marketing strategy and clout.

On the surface, the Intel Corp. 80386-based Model 80 has some impressive hardware credentials. Its 32-bit processor cruises at 16 MHz. It comes standard with 1M byte or 2M bytes of main memory, expandable to 16M bytes, and is equipped with a 44M-byte fixed hard drive. Another 44M-byte drive can also be added.

The PS/2 Model 80 contains fewer components and boards and is built on a more modular basis. Is this construction an important factor to users?

"It will cut down on maintenance and repair costs," explains David Nickolich, a systems analyst with the information systems application development center of Indianapolis-based Indiana Bell.

"For those large firms with hundreds of micros, labor costs are going to be a lot lower for in-house micro repairs. Anything that will make it easier and less costly to repair [these machines] will get MIS support," he says.

IBM says that the Model 80 represents the company's best shot at vertical integration, claiming that roughly 80% of the component parts, including the 1M-byte random-access memory (RAM) chips, IBM hard disk drives and custom chips controlling disk storage, come from Big Blue's design laboratories and manufacturing facilities. Built into the system are 3½-in. floppy disk drives, serial

For *CW Focus*'s interview with Rod Canion of Compaq, turn to page 32

and parallel ports and IBM's higher resolution Video Graphics Array (VGA) chip.

Despite IBM's confusion in introducing two kinds of 3½-in. disk drives, one at 720K bytes and one at 1.44M bytes of memory, users generally agree that the 3½-in. format is the way of the future.

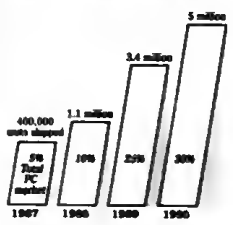
Not for everyone, though.

Many users are confused about the format conversion. "I couldn't go for the 3½-in. drive right now," explains Sandra Patterson, marketing coordinator at The Benham Group, Inc., an architectural engineering firm in Oklahoma City. "I don't know how you'd get existing applications over to that new format."

A key element in IBM's claim that the Model 80 heralds a new personal computer architecture is the Micro Channel bus. The IBM Micro Channel carries up to 32 bits of data to and from the processor, about twice the capacity of most earlier IBM PCs. It will also give users multitasking capability. The Micro Channel can support up to 15 direct memory access devices, more than double the number available on the existing IBM PC bus. With more memory access devices and faster data rates, analysts say there will be a definite improvement in application throughput. The Micro Channel also contains seven expansion slots.

386 PC staying power

Worldwide shipments of Intel Corp. 80386-based micros



INFORMATION PROVIDED BY GARTNER GROUP, INC.

"I don't think many people are going to find fault with the Model 80 hardware," explains Leland Freeman, consulting editor for the "James Martin Report" in Marblehead, Mass. "I think IBM is establishing a hardware standard."

Illinois Bell's Nickolich agrees. "There are so many new things in the PS/2 line," he says. "Add-in boards are easy to plug in and take out, there is less wiring in the box, everything seems to be composed of snap-in components, and it seems like it's adaptable to robot engineering, which will give IBM more room to fight the clones in price wars. I think others are going to follow in line."

Which brings us to PS/2 software, a real bone of contention. At this time, IBM is only offering PC-DOS 3.3 for its 386-based machine. PC-DOS 3.3 is an extension of Microsoft Corp.'s MS-DOS 3.0 series of operating systems for IBM PCs and compatibles. The "real" 386 operating system, the OS/2, is still shrouded in some mystery and not slated for commercial release until 1988.

"OS/2 is what PC-DOS 3.3 should be now," Freeman claims. "PC-DOS 3.3 doesn't do anything for the Model 80 except fill a gap until OS/2 arrives. OS/2, however, is going to be a major reawakening for the desktop environment. It finally breaks the 640K-byte barrier. One expert said the fault line between MS-DOS and OS/2 is as big as the one between the [Apple Computer, Inc.] PC and the IBM PC or between [Lotus Development Corp.] Visicalc and 1-2-3. The point is, OS/2 will make a big splash."

It just might. OS/2 will enable programs to access up to 16M bytes of main memory on the Model 80, finally eliminating the need to fit individual programs within 640K bytes of memory. The extra addressing space given by OS/2 obviates the need for users to exit from one large program in order to use another. The 16M bytes of addressable memory is nothing to sneeze at because it is 25 times the memory allowed by existing MS-DOS versions. This extra space opens up new avenues of corporate microcomputing. Not only will users have access to large programs and data, they will also be able to do multitasking and work on several programs concurrently.

Three stages

OS/2 will be divvied up into three stages, a policy destined to be confusing to many customers. OS/2 Standard Edition 1.0 will support enhanced memory space, multitasking and the existing MS-DOS operating environment. Standard Edition 1.0 is due in April 1988.

Standard Edition 1.1, which will replace 1.0, adds IBM's Presentation Manager, a graphics-based program interface with windowing capabilities based on Microsoft's Windows. IBM seems to have finally opted for Windows over its moribund Topview windowing program.

Beyond the standard editions comes the OS/2 Extended Edition, which really begins to make things exciting. The Extended Edition is scheduled to toss in a relational data base management system, terminal emulation and connectivity consisting of application development facilities for IBM's Dialog Manager, remote local-area network (LAN) data services, Systems Network Architecture (SNA)/LAN gateway support and IBM's Enhanced Connectivity Facility.

However, don't expect OS/2 Standard Edition 1.1 and the Extended Edition to

be available soon.

Although these software programs will not arrive commercially for some time, they slowly put IBM's micro plans into perspective. The company, for example, has stated that the data base manager running on the Extended Edition of OS/2 will be compatible with the current DB/2 version running on IBM 3090 series mainframes. IBM also announced that OS/2 will support the firm's Systems Application Architecture (SAA), a planned common programming interface across the diverse range of IBM systems.

Van Weathers, a director at San Jose, Calif.-based Dataquest, Inc., maintains that if IBM is aiming to make its 386-based systems the standard in corporate microcomputing, then SAA will play a major role in getting the company there.

> **"IBM has upped the stakes. These clones are going to have to be functionally equivalent machines and not just duplicates of the PS/2."**
>
> BILL KIRWIN
> THE GARTNER GROUP, INC.

"I think IBM is going to move rapidly to implement SAA," Weathers says. "IBM refers to the PS/2 as an intelligent workstation, and it is going to use it as an offensive weapon to create a uniform interface to all its system architectures.

"SAA is both a defensive and offensive maneuver by IBM. Defensively, it represents IBM's turn in midstream to answer the critics who pointed to Digital Equipment Corp.'s success with uniform interfaces and architectures. IBM's System/36 and 38 and 4300 series computers, for example, have incompatible architectures and several inconsistent user interfaces that will be corrected by SAA. Offensively, IBM is going to use SAA to grab new markets and keep its customers loyal. The Model 80 is a good way of getting SAA into the micro level," Weathers says.

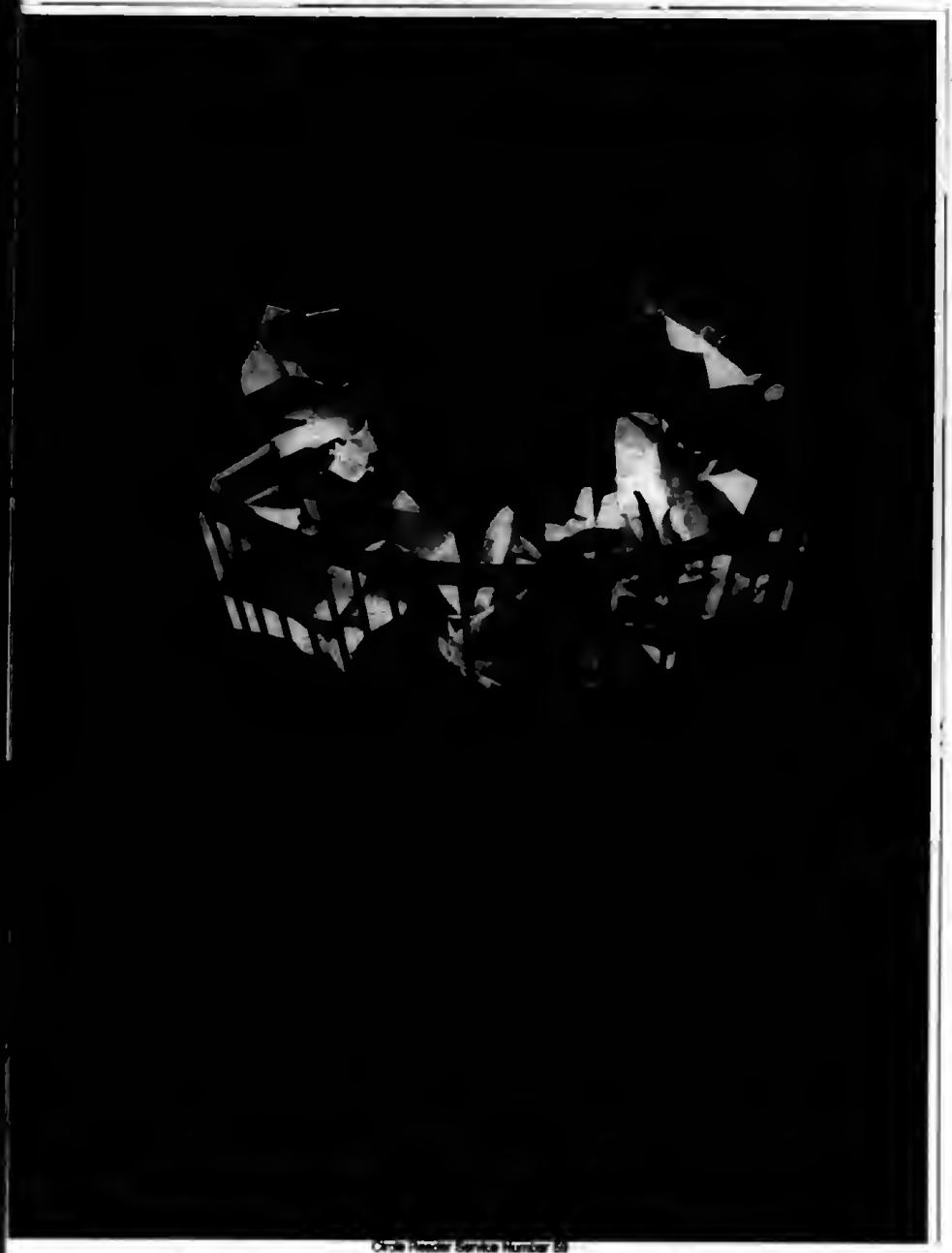
Bill Kirwin, program director of personal computing at The Gartner Group, Inc. in Stamford, Conn., agrees and adds that SAA represents a good way for IBM to have its micros penetrate the user environments of other vendors.

"The world is becoming more amenable to mixed-vendor environments," Kirwin explains, "and SAA is made up of a number of interface options. DEC, for example, already is planning an SAA interface. Others will be doing the same."

Weathers says he feels the Model 80's multiuser capability is another key facet.

"I think this feature will actively appeal to the expansion of the market because the market comprising small minicomputer systems and PC groups with up to about five users is a very mixed-vendor market," he claims. "The PS/2 Model 80 and other 386-based machines will take this market by storm. I wouldn't be surprised if the Model 80 is expanded upward to overlap with IBM's multiuser systems such as the System/36s."

A recent Dataquest report stated that OS/2 is the long-awaited MS-DOS 5.0. The report goes on to suggest that, although the OS/2 software announcements are important, they are primarily short term. IBM, the research firm suggests, is planning nothing less than an all-encompassing system architecture that will link all IBM computers, including the PS/2s, under one umbrella. Tying everything together will be IBM's VM.



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The tie that binds

"This [VM] strategy is apparent in the MS-DOS 5.0 debacle," the Dataquest report reads. Although observer opinions are divided on how far IBM will port VM into its low-end micros, IBM has stated it intends to make VM the operating and program development environment that will bind desktop and workstations with mainframes through IBM 9370 departmental computers.

"The concept of bringing VM to the desktop is intriguing, although I don't think it's going to happen," Kirwin claims. "OS/2 has certain VM characteristics anyway."

Weathers adds that there are some busy developers out in the field putting VM on 386-based machines "simply because IBM isn't. If the VM/386 market develops, it will remain a separate and distinct market for several years."

Although it is an impressive plan, the integration of SAA, LU6.2 and, possibly, VM is still a long way off. If IBM is out to create a new standard in microcomputing, it will not happen this year nor will it be likely to occur next year. Dataquest points out that even though IBM announced 80 PC products last April, most of these offerings will not be delivered until after the third quarter of this year. Short-term objectives are now important to IBM as a bridge to carry customers and sales successfully into 1988 and into IBM's long-term 386 objectives.

But do the PS/2 Model 80 and PC-DOS 3.3 offer enough now to persuade customers to buy? There are few mainstream software applications that can take advantage of the speed and power of the 386 processor. Software programs for IBM's 3½-in. disk drives are slow coming off the mark. Though IBM has announced seven Solutionpac programs for the PS/2, most

INTERVIEW

Will IBM PS/2 hurt Compaq? No, according to Rod Canion

Rod Canion is president of Houston-based Compaq Computer Corp., IBM's biggest competitor in the corporate personal computer market. Canion recently spoke with Stan Kolodziej, *Computerworld Focus*'s senior editor, about IBM's Personal System/2 machines and OS/2 operating system as well as Compaq's view of the future of microcomputing and the company's role in it.

Is IBM going to be successful in creating a new de facto personal computing standard with its PS/2 line of micros?

There are two separate issues involved. The personal computer standard that's been in existence the past five years has constantly been moving forward. The question is, Do people want a new standard? That's easy to answer. People do not want the pain and the cost of moving away from the existing standard. If you asked people if they wanted to change from the current standard, I think they would almost uniformly answer no. They want to move forward, they want new technology, they want improved performance, but they don't want to have to pay the penalties of breaking from the current standard.

Are you including OS/2 in that assessment?

No. OS/2 is, in fact, very important, will be real, and we'll be offering it. My problem with IBM is in the way it related PS/2 and OS/2 to each other, as though the implication of their announcement was that OS/2 and PS/2 were basically one and the same. OS/2 is totally independent of PS/2. The PS/2 has to be evaluated on its own merits as a hardware system, and I've recently been pointing out the incompatibilities of PS/2 that don't seem justified.

The impression I have is that OS/2 will run on existing Intel Corp. 80286 IBM Personal Computer ATs but at an excruciatingly slow pace.

Not true. Take a look at one of IBM's PS/2 machines, the Model 60, which has a 10-MHz processor. Compare that to Compaq's Deskpro 286, which has a 12-MHz processor. If there are any differences in speed related to IBM's new Micro Channel bus — and nobody's been able to show any differences — the differences are still going to be much less than the existing 20% difference in processor speed. So we're contending that our Deskpro 286 will run OS/2 better than the PS/2 Model 60.

Is there anything in the IBM PS/2 announcements that could cause trouble for Compaq?

Not that we've seen. The whole issue is whether most companies will suffer to convert to IBM's new architecture. Because they don't have to [convert], it's going to be an interesting test of how much IBM can influence its customer base.

Canion

You were quoted recently as saying that if your customers wanted a PS/2-compatible computer, Compaq would deliver one.

We've always emphasized meeting user needs above everything else, and when I take a position on the PS/2s, I'm not trying to tell users what they should do. What we're trying to do is help them understand what their trade-offs are, what their choices are, but we'll look to users in the long term to decide what they want.

I hope they know what they want better than anyone else.

IBM has made it clear that it will support third-party hardware and software developers enhancing the PS/2 line. The company has also been sounding a little belligerent about protecting technology patents, which leads many to believe it will take PS/2 compatible and clone makers to court. Will any of that stop you from producing a PS/2 compatible if your customers want it?

We don't know what IBM will do for sure. Our belief is that if we need to, we'll be able to offer a compatible machine.

If you were IBM, what would you have introduced on April 2?

Well, there's a very clear path of success in PCs that I think IBM could follow just like the rest of us. That path is to bring new technology and new enhancements to the PC market in a compatible way, so that the transition to these new capabilities is painless.

That's been done many times now in the last five years, and each time it has been done right, it has been done successfully.

For IBM to add the pain and costs unnecessarily, as it has done with its new products, raises a big question as to how successful the company will be.

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notably the Personal Publishing System and the Publishing System VM Edition, much of the meaty stuff lies in the future.

Illinois Bell's Nickolich says he is still evaluating the Model 80. "The first users will be the heavy number crunchers who need the Model 80 for generating mainframe program code, statistical analysis and so on. The Model 80 has great graphics, though, and much better resolution than the old IBM [PC] graphics. To have the VGA graphics already built in and ready to use is a big selling point," he says.

"This is where IBM's marketing influence becomes so important," Weathers claims. "If anyone can create a standard through sheer immense marketing force, it's IBM."

Kirwin adds that IBM will create some industry ripples on the way to establishing the PS/2 Model 80 as the de facto corporate micro of choice. For one thing, he says, the PS/2 line is going to help perpetuate a three-level PC market.

"At the top end are loyal IBM customers who have always gone with IBM, who might have purchased System/38s and who are conditioning themselves for the IBM 9370s," Kirwin says.

"The next tier will consist of those companies adopting such multiuser systems as DEC minis and IBM mainframes. These people will be looking more toward the [International Standards Organization's Open Systems Interconnect] standard rather than IBM's SNA. They have their options of going with PS/2s or other micros. When IBM stops shipping its Personal Computer XTs and ATs, some of these users will go to the clones.

"This is a market that IBM has been a partial player in until now, but with its 386-based engine, SAA and multiuser software, IBM will become a bigger player," he says.

"IBM has no control over the third level," Kirwin says. "This is the low-end PC market consisting of stand-alone machines, mainly clones. These people don't care about the PS/2s."

The new standard

Kirwin adds that IBM's attempt to market the Model 80 as a new standard in microcomputing has been clear from the start. The entire PS/2 announcement, Kirwin maintains, was aimed at differentiating the PS/2 line from the more commoditized existing 386 and 286 markets.

"IBM is targeting the Model 80 at its 500 key customer accounts," Kirwin says.

"By mentioning OS/2, DB2, SAA and so many ambitious communications links and development software in the same breath as its PS/2 line, IBM has sent a message to its big customers — 'The Model 80 is an integral part of our new overall computing strategy, and there is now a big disparity between the two worlds of as and them.' "

Weathers agrees that IBM can use SAA in combination with the PS/2 Model 80 to prove the product and move the arena away from the plug-compatible or clone vendors. And where exactly will this strategy leave the IBM PC-compatible vendors, such as Compaq Computer Corp. and the legions of clone makers?

"People have said Compaq has a pretty loyal core of customers, but I don't think that washes," claims Jim Weber, president of Insight Technology, Inc., in Piscataway, N.J. "What Compaq does have is a loyal core of dealers built on the great profit margins Compaq gives them on their micros. If they keep those margins in place, I think Compaq will continue to do well."

Kirwin says that Compaq will have to work hard to maintain its current leading market position.

"IBM is going to use the PS/2s as a way to regain lost ground in the PC marketplace," Kirwin says. "Compaq is one of the big targets. A large part of Compaq's success has been to offer 20% greater performance over equivalent IBM PCs at 20% less in price. IBM is pricing the PS/2s competitively from the start, however, so the challenge will be to match or beat IBM's machines in functionality.

IBM wants to be a moving target and have others come at them. The PS/2 will become the standard at which others will aim," he adds.

Aiming at that standard might prove more difficult than expected. IBM has placed a roadblock in front of clone makers. The same IBM proprietary components in the PS/2 Model 60 that Nickolich applauds will also prove a formidable task for most clone companies to duplicate.

"These will not be cookie-cutter clones like previous PC machines when the only unique IBM component was the BIOS," Kirwin says. "IBM has upped the stakes. These clones are going to have to be functionally equivalent machines and not just duplicates of the PS/2."

And Kirwin says that requisite makes for a much different clone market — one that will have to work with a new IBM architecture with application-specific circuits, advanced BIOS and a Micro Channel bus. That will require a new order of reverse engineering and money, manpower and marketing, the likes of which are only within reach of Compaq and a few others.

Moot point

That is, of course, if IBM will even allow it. Right now, that point is moot. With one hand, IBM has been beating its litigation drums, as Bill Lowe, IBM's Entry Level Systems president, warns that the company will take action against anyone who copies patented PS/2 technology. IBM is using the other hand, however, to stroke concerned hardware and software developers, assuring them that the company will go out of its way to accommodate third-party enhancements to the PS/2 Micro Channel and VGA.

Even Rod Canion, Compaq's president, will not venture to say how IBM will react to alleged violations of its technology patents. "That's just too unpredictable," he says. (See Canion interview above).

According to Freeman, there could be another key element in IBM's marketing strategy.

"In these days of sagging mainframe sales," Freeman says, "IBM could begin pushing the sheer power of its 386-based machine to help take up some of the sales slack. With 386-based machines now offering one [million instructions per second (MIPS)] for about $3,000, you can buy dozens of micros for the cost of one mainframe MIPS. IBM could really start selling the Model 80 on power as well as its closer mainframe ties. In such a scenario, mainframes could eventually become data base machines, giving way to the distributed power of the PS/2s and other 386-based machines. The OS/2, with multitasking, is a big step in that direction."

So, will the Model 80 become a standard?

"I don't know if it will be a separate standard," Nickolich concludes. "I don't even know that it's that important. I do know it's an impressive machine." ◆

Help for the PC junkie

Channeling a power user's energies

BY REBECCA HURST

He was the local hero in his company. He was a business user with a lot of personal computer expertise. He was a power user.

At first, the employee provided co-workers with help for their PCs, earning their friendship and admiration. "He was in a very nice situation," recalls Charlotte Hofmann, president of Information Ideas, Inc., an Oakland, Calif.-based management consulting firm.

However, that situation gradually soured. "MIS regrouped and began providing the support it should have begun earlier," Hofmann says. The power user did not like this intrusion on his expertise. He told users not to rely on MIS, she says. "He sabotaged MIS support." In the process, Hofmann notes, the power user's job began to look redundant.

The power user hurt his image, not only with MIS but with his work group as well. The man began exuding a great deal of confidence about his technical expertise and stopped making friends, Hofmann explains. As a result, he probably will be on the company's next layoff list, she predicts. "There's no one to root for him."

The relationship among top management, MIS and PC users often has been filled with confusion and ambivalence. But the average PC user is now earning increasing respect and support. Managers see PCs as a means of improving employee productivity. MIS, flooded with requests for PC support, likes to see self-sufficient users.

However, the techies, or power users, once revered by companies for leading the use of PC technology in business, are often viewed as a threat to MIS and a drain on resources. Additionally, managers often question the balance of time these users devote to technology and to their official duties.

ROBERT PIZZO

The problem does not rest exclusively on the power users' shoulders, though. MIS and business managers are equally responsible for the corporate culture that has contributed to unwanted power user practices. These managers are also responsible for implementing changes that can turn the power user from a problem to an asset.

Before trying to solve the problem of power users, managers need to take a close look at these users and their relationships to other employees. From a study of PC users, Information Ideas' Hofmann has developed a four-tier model to describe the levels of PC expertise within corporations. The model categorizes users as potential, typical, technical and advanced. The number of employees who fall into these groups shrinks with

Hurst is a *Computerworld Focus* senior writer.

each successive level of expertise.

Potential users are the largest group, accounting for 50% of the people who fit into the model. These employees work with information and could use PC technology to improve their productivity, Hofmann says. This group consists of clerical workers, professionals and upper management.

Typical users may account for 40% of the employees who can benefit from PCs, according to Hofmann. "Typical users should be very close to the business process," she says. They use PC applications, such as word processing and spreadsheets, to provide informational support. These users have a generic understanding of the computer and depend on others for technical support, she adds.

The line between typical user and technical user is a big one, Hofmann says. "The territory above that line is dangerous." Technical users are mesmerized with the technology, she comments. "I would wonder about a president who regularly uses Lotus Development Corp. 1-2-3," she says, because he should be delegating such functions to his staff. "If he or she is using the PC for electronic mail, though, that's great."

Frustrated by a lack of promotions, some employees attempt to take advantage of weak managers to build their own power.

There is also some debate whether power users know more about products than how to use them to support the information they need, she says. These users may focus on learning one application to the exclusion of other ones. For example, some users know 1-2-3 so well that they use it for word processing instead of doing their work more efficiently with a word processing package.

Technical or power users can also be an asset, however. "I've seen power users use PCs in some absolutely creative and productive ways," comments Irene Nesbit, president of Nesbit Systems, Inc., a Princeton, N.J.-based consulting firm. "They see that they have a tool at their desks, and they're using its potential to improve their work." In addition, technical users help co-workers improve their productivity using PCs.

Advanced users are tired of concentrating on the technology, Hofmann says. These users generally are managers who realize the need to concentrate on business so they take on a mentor role and train others to become technical users. Advanced users are good for a corporation because they have a strategic knowledge of the business and technology. "They can grow into good chief information officers."

There are several ways in which power users can contribute to a company's growth. However, managers that bring out the assets of these users have to consider a complex matrix of factors. First, corporate managers must face two huge areas of concern: users' emphasis on technology and the need for greater PC-level support. Second, the types of action managers take will depend largely on whether power users have decided to remain in their current profession or shift to a technical career.

Most power users have to choose between their profession and a technical career if they want an extended career path. Some users find unofficial positions in their departments in which they combine company business with end-user support, says Naomi Karten, president of Karten Associates, a consulting firm located in Randolf, Mass. Because the position is not officially recognized, upper management may question the time devoted to helping co-workers, she says. Also, MIS often fails to recognize this user's assistance in offsetting support requirements. No matter how well-intentioned, the power user could become a casualty of company layoffs.

Some power users are less benign. Frustrated by a lack of promotions, some employees attempt to take advantage of weak managers to build their own power. The most vulnerable managers tend to be intimidated by computing, Hofmann says. Technically competent employees may convince managers that they have a better grip on business information.

"In some cases, a manager ceases to attend steering committee meetings," she says. Instead, the power user assumes the manager's role. However, any influence these users may gain is usually short term, Hofmann notes. "They are either fired or laid off."

Managers of MIS departments and their end-user extensions, information centers, largely determine whether employees who want to shift to a technical career will find a position at their current company. For organizations with overworked, understaffed information centers, hiring power users for end-user support positions can provide a win-win solution. "User support has become more complicated," Nesbit says. "Companies need a manager who understands PCs and the business and who can coordinate with MIS."

'Users know a lot more'

Karten agrees. "Information center people used to stay a half hour ahead of the end users. It's difficult today because users know a lot more. Sometimes they

know more than the information center people."

Another problem is that PC users far outnumber the people assigned to support them, she says. MIS and information center managers need to realize the need for more end-user support and take advantage of existing expertise within the company, Karten asserts.

Such power users could be clerical workers as well as professionals, Hofmann notes. Secretaries with five years of word processing experience are often advanced technical users, she says, but other employees may not listen to them. These secretaries usually have to make the transition from clerical worker to technical professional by moving to another company, she notes. MIS and information center managers who overlook these power users may be letting corporate resources slip through their fingers.

Reporting structure

Power-users-turned-support-providers can report centrally to MIS or the information center, or they can report to the department managers, Karten suggests.

"I've seen job postings in departments hiring technical specialists because they've seen the need. To users familiar with information centers, these positions looked everything like postings for an information center manager," Karten says. Whether these support roles appear in MIS, the information center or the department, they should be formally recognized to promote effective corporate backing and a career path for employees.

However, while power users may be good in end-user support roles, they may not have the background to support data processing functions, Hofmann cautions. Distributed processing is an important part of corporate computing, she explains. "Micro users have learned distributed processing from the ground up," she explains. "They began with 'sneakernet,' in which they passed floppy disks to a PC local-area network." By contrast, MIS professionals have focused on mainframes and minicomputers, which have evolved toward distributed processing, Hofmann notes.

One power user convinced a small company that he could handle the duties of an MIS director, Hofmann recalls. Six months later, the company demoted him and hired an MIS director with a DP background.

'Didn't have the experience'

"He didn't have the experience to run an MIS department, even though it only served five people," she says.

Offering user support positions is a good solution for power users who have discovered a technical vocation. However, MIS and upper management also have to realize that some power users want to focus on their professions at hand. With little encouragement, these users find themselves flooded with requests for help from other workers. In these instances, MIS must find a way to support the average end user better, relieving power users of their roles as technical assistants and allowing them to get back to their careers, Nesbit advises. Some power users in management positions may also be in a position to delegate technical support responsibilities.

For example, David Jacobson, a planning officer for the Internal Revenue Service, works in a division that relies heavily on microcomputers. "We have about 1.2 to 1.3 micros per person," Jacobson says. He explains that in the past he and two other power users had problems balancing work and interruptions from less experienced users. "My major concerns were keeping people away from me and doing my job," he recalls.

MIS must support end users better, relieving power users from their roles as technical assistants and allowing them to get back to their careers.

To handle these users, Jacobson established formal channels for assistance by establishing secretaries and paraprofessionals as PC applications experts. In addition to their regular duties, these employees are responsible for supporting an area of technology. Some of these staff members have been trained as experts in Micropro International Corp.'s Wordstar word processing software. Others are designated experts in 1-2-3, Ashton-Tate Dbase III or graphics software. With the support system in place, Jabobson says, few questions come to him or other power users. "People realize that they'll get a quicker, better solution if they go to the designated experts."

From negative to positive

By engaging clerical workers in technical support, Jacobson has also turned the negative effects of office automation into an opportunity. As professionals began using PCs, secretaries and paraprofessionals had less work, he explains. "Our secretarial staff shrunk by 40%, and the remaining clerical workers did not have enough to keep them busy." These employees, trained in PC applications, report they find end-user support more fun than mundane clerical chores, Jacobson says. Also, their technical expertise gives them a pathway to professional positions, he adds. "Some secretaries have already left for programming jobs."

Beyond support issues, managers also face the problem of users who let their fascination with PC technology subvert their professional obligations.

To a large extent, power users must put their careers in perspective. Hofmann suggests that one way users can accomplish this task is to write down five functions they have been hired to perform.

Managers can also help by talking with employees who appear to be losing their career focus, she adds.

Power users can make the transition to advanced user once they realize their professional objectives, Hofmann says.

For instance, one power user in the finance industry realized that his best career path lay in climbing the financial management ladder, she says. After training someone to be the next-generation personal computer expert and refocusing his efforts on finance, Hofmann notes, "he received a promotion within four months."

When a power user is failing his business obligations, his manager should call the problem to the user's attention before it becomes serious.

The problem of users seduced by technology is also a problem of management and training, the consultants agree. "Power users know all the features and functions of the PC products, but they don't know how to relate them to the data they use," Karten says.

Forgetfulness

A related problem among average users is that they forget what they learned in their personal computer training classes before they can put this knowledge to use, she notes.

Karten maintains that both these problems stem from one root cause. "PC training is usually done out of context," she says. "Trainers teach users about the products and the mechanics of using them, but they don't show people how to use these tools to solve specific business functions."

MIS and information center managers need to establish training programs that emphasize problem solving from the start, Karten asserts. Otherwise, the training leaves users with a gap between knowing the technology and knowing how to use it.

A happier ending

Given the management options for handling PC power users, perhaps the story of the fallen hero who tried to sabotage MIS could have ended differently. Perhaps early training and a company emphasis on the PC as a tool would have helped the power user retain a better perspective on his business obligations.

Noticing the user was failing those obligations, his manager could have called the problem to the power user's attention before it became serious.

Even after the power user had alienated MIS, he might still have found a place in that department, Hofmann suggests.

"If his manager proposed him by name, MIS's answer would have been, 'No,'" she says. However, the manager might have been able to sell this user to MIS in terms of the functions he could provide. "The manager could talk to MIS in terms of the company's need for support and the existing resources to provide it," she suggests.

In any case, the power user should not have been dealing with MIS by himself, Hofmann argues. "That's the manager's responsibility."

Before either business or MIS managers can do anything about power users, however, they need to acknowledge that a problem exists, Hofmann says. "It's not a matter of assigning blame," she states. "Managers just need to look at the problem and talk about it." ◆

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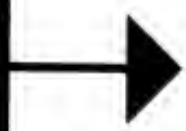

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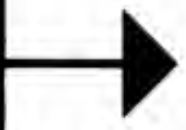

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products

TECH TALK

Covering all the bases at Comdex conference

BY MICHAEL TUCKER

As far as personal computers go, Comdex/Spring 1987 was energetic.

The add-in board makers were particularly active. That action may prove to be significant, because with the introduction of the IBM Personal System/2, people were concerned about the add-in board industry. The feeling is that IBM plans to monopolize or dominate the add-in business by controlling developers' access to the PS/2 bus, the Micro Channel.

It may be that the aftermarket for the PS/2 is just going to be too expensive a game for the garage entrepreneur. But the big-league players seem to be adapting to the rule changes without much difficulty. Quadram Corp. in Norcross, Ga., for instance, was showing not one but three memory/multifunction boards for the PS/2 Models 50 and 60. These were the Quadmeg PS/Q, a 2M-byte memory board; the Quadport PS/Q, an I/O board; and the Quardboard PS/Q, a 2M-byte multifunction board. All three reportedly are due for shipment between this month and September.

Desktop publishing puts spotlight on large display monitor market, page 41.

Meanwhile, as if to prove that the original PC bus isn't dead, the motherboard makers were in good form as well. Atlanta-based American Megatrends, Inc. introduced an Intel Corp. 80386-based motherboard for IBM Personal Computer AT-compatibles. The firm claimed that the board is up to 25% faster than Compaq Computer Corp.'s comparable model.

American Megatrends was also talking about but did not introduce a PS/2-compatible Intel 80286-based motherboard for "some time in the near future." (Just when you thought it was safe for IBM to go back in the water — Clones 2!)

There was also a considerable number of complete AT-compatible systems demonstrated at Comdex, including some offerings from Xtra Business Systems, headquartered in San Jose, Calif. (Xtra, until recently, was known as the Information Systems division of ITT. Then, along came the restructuring craze, and now it is a separate firm).

Xtra rolled out an entire line of machines — the Xtra/Professional series — just like IBM did with the PS/2. These systems range from an Intel 8088-based Model 300 (not to be confused with the 8088-based IBM PS/2 Model 30) to a top of the line, 80386-based, floor-standing 386/XL (not to be confused with the 386-based, floor-standing PS/2 Model 80).

Hedging their drive bets

The Xtra line is clearly the choice for micro managers who want to hedge their bets. One of the options on the systems is that you can get both a standard 5¼-in. floppy drive and a PS/2-style 3½-in. drive. Prices on the line range from $1,299 for the Model 300 to $21,295 for the 386/XL.

Software looked good, too. A number of companies were starting to show PS/2 applications, which is rather remarkable when you think about it because there aren't that many PS/2 users out there. CXI, Inc., located in Mountain View, Calif., was showing a number of communications products in both hardware and software. On the communications software side there was the Pcox/Two, a 3270 micro-to-mainframe link for the PS/2.

Actually, the most interesting software news on the PS/2 came a few days after Comdex, when Lattice, Inc. in Lombard, Ill., announced that it was prereleasing a version of its C compiler for IBM OS/2 (see story page 40).

I'm not really sure what "prereleasing" means. It seems to translate into the fact that Lattice has had the product in beta test since October of last year. Apparently, it works well enough that the firm can actually talk about it as a product rather than a project.

There is something surreal about all this activity because the OS/2 won't be available for about two years. Wouldn't it be amusing if OS/2 becomes the first product to develop a mature aftermarket *before* it ships?

Continued on page 41

PRODUCT CLOSE-UP

Disk conversion tool out

A possible sore point with users of IBM's Personal System/2 microcomputers is that they are unable to use the PS/2 to access data from existing 3½-in., 5¼-in. or 8-in. disk drives.

To remedy this situation, IBM has recently released its 4869001, 5¼-in. external disk drive interface for the PS/2 family. IBM's package, however, does not get any points for simplicity.

To assemble the 4869001 fully, users will need a drive carriage that has to be inserted into the PS/2's second drive cavity, a flat bus cable that wraps through the PS/2's housing unit and connects to a vacant controller card that takes up one of the open slots in the back of the PS/2 and a cable from the PS/2's D connector to IBM's 5¼-in. external disk drive and power assembly.

According to David Chevalier, director of communications at Flagstaff Engineering, Inc. in Flagstaff, Ariz., the IBM procedure takes up to 25 minutes to complete. More importantly, it costs $395 — $335 for IBM's new 5¼-in. drive and $60 for its extra bus connector. Rubbing salt in the wound is the fact that users still cannot access their existing 3½-in. or 8-in. disks with the new drive.

Edapt reportedly takes five minutes to install and can access a variety of drives.

Flagstaff has come to the rescue. The company's $99 Edapt system can do the same thing as the IBM product, Chevalier claimed. Edapt reportedly only takes five minutes to install and can access a library of 3½-in., 5¼-in. and 8-in. disks on existing drives.

But Chevalier put certain qualifications on his statements.

Continued on page 41

BLUE BEAT

Havoc, IBM style

Deidre Depke

By introducing the Personal System/2 in April, IBM not only threw the microcomputer industry into chaos, it radically changed the way vendors and users look at personal computers.

The havoc IBM wreaked on the industry was immediately apparent. On one hand, compatible makers quickly criticized the machine and its Micro Channel architecture for incompatibilities and poor technology. But on the other hand, these vendors voiced support for the PS/2's accompanying operating system, OS/2, leaving users wondering what standard these firms were really endorsing.

Software developers pledged to produce their products on the 3½-in. disk format that the PS/2 uses but could not provide a timetable for when the versions would be available or how the applications would change.

Product supplies in the retail channel almost immediately dried up. Suddenly, it became as difficult to get an IBM Personal Computer XT, AT or Compaq Computer Corp. machine as it became to find a $2 movie ticket. Retailers and vendors were shocked: Micro sales generally slow to a standstill following an IBM announcement as users evaluate the products.

Wall Street reaction

Wall Street fell into a panic of indecision. Immediately after the PS/2 introductions, high-technology stocks rose in anticipation of a recharged industry. Later, as analysts began to evaluate the sales prognosis of these

Continued on page 40

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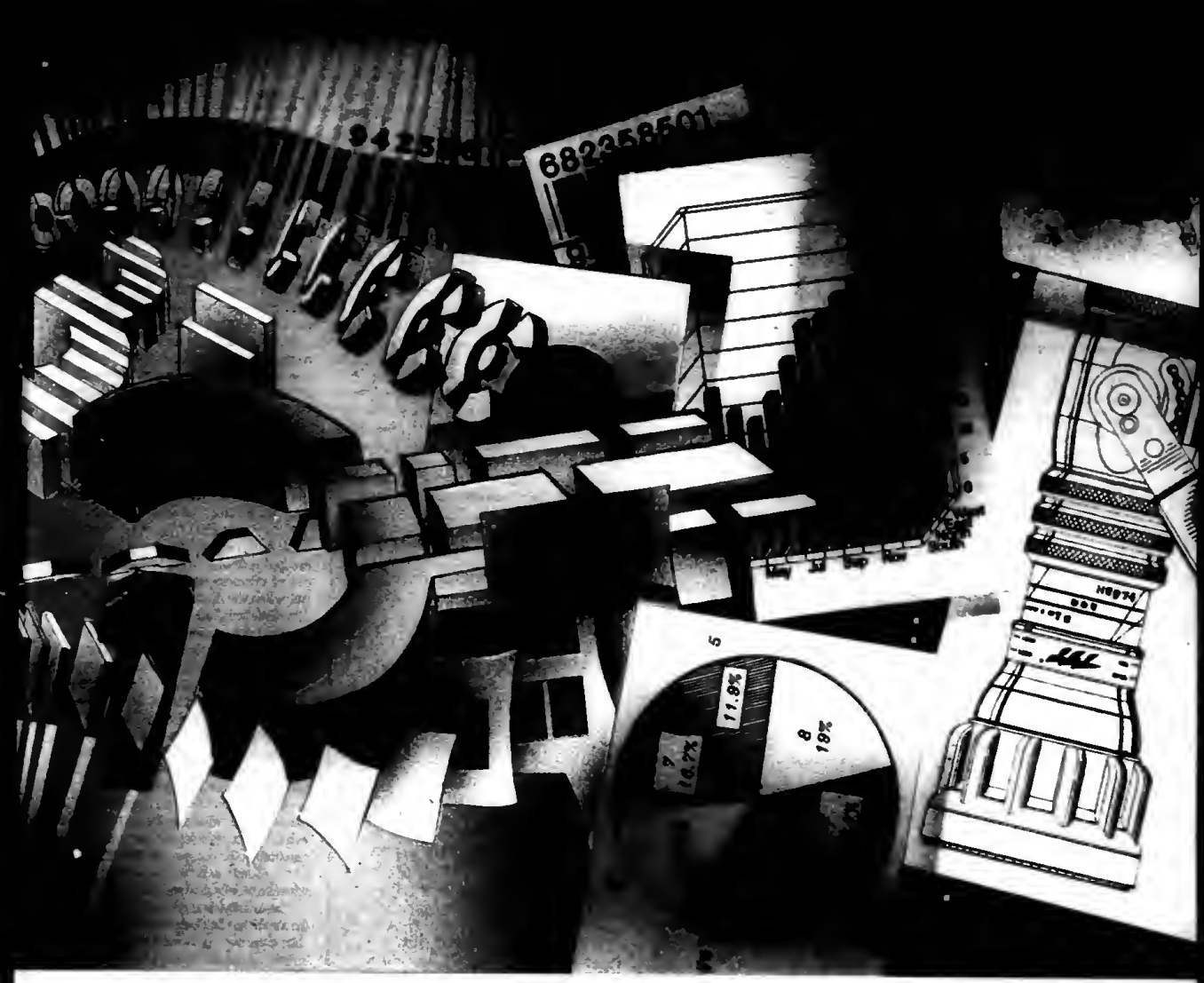

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Circle Reader Service Number 62

C compiler for OS/2 to debut

One of the first C compilers for IBM's OS/2, the multitasking operating system for the firm's Personal System/2, has been preannounced by Lattice, Inc. in Lombard, Ill.

The Lattice C compiler for OS/2 has been in beta test since October, and a complete, production-quality version is expected to be shipped sometime this fall. However, an initial prerelease copy of the compiler is currently available to users of Lattice's C compiler for Microsoft Corp. MS-DOS at a fee of $150.

When the production version is ready, users of the prerelease compiler will receive it free of charge. The compiler's price to new users is not yet known.

Short-order conversion

Lattice is a long-time maker of compiler products. Its C for MS-DOS is an acknowledged market leader. Apparently, the MS-DOS-based C compiler was developed with enough OS/2-like features that it could be converted to the new operating system in short order.

This ability for quick adaptation could say a great deal about the nature of OS/2 and its kinship to MS-DOS. It may be that developing applications for OS/2 will be less difficult than was first feared.

Lattice said its compiler will not be bound by MS-DOS's 64K-byte limit. It will give programmers the power to set the default integer size to 32 bits. Lattice also said it plans to offer programmers' tools for developers working with OS/2. In addition, the firm will reportedly offer expanded manuals for the C compiler.

Meanwhile, the industry continues to await the actual shipment of OS/2, which is not expected to be in users' hands until 1988 or later. — MICHAEL TUCKER

Circle Reader Service Number 136

Blue Beat

Continued from page 37

machines, they launched a selling spree of the same stock, fueled by speculation that the PS/2 would sell poorly and that OS/2 would be delivered late.

Suddenly, everyone was calling press conferences to explain their positions. Compaq hosted the most star-studded event; it dragged Lotus Development Corp.'s Jim Manzi, Microsoft Corp.'s Bill Gates and Ashton-Tate's Ed Esber to New York July 6 to clarify what was happening in the industry. Even IBM got into the act, reassuring security analysts and the press at a June meeting that PS/2 sales were better than expected.

Clearly, the PS/2 will not be a bomb for IBM. And compatible makers, board makers and software firms will not be driven out of business by the new technology. But when the dust settles, users and vendors alike will find that the microcomputer industry has changed for good.

A systems smorgasbord

Users will be left with far more choices than ever before. For the first time since the death of Digital Research, Inc. CP/M (remember that?), users will be able to standardize on two separate operating systems: Microsoft's MS-DOS or IBM's OS/2. They will even be able to run both systems within the same organization. At Comdex/Fall '87 in Las Vegas, computers will likely come with a choice of boards: one built to be compatible with the Micro Channel and one built for compatibility with the MS-DOS standard.

Eventually, users will find that many firms will not sell PCs any longer; instead, they'll be selling workstations. IBM has already gone beyond using the phrase "personal computer." Now, only the most unsavvy IBM staff members call the PS/2 anything but a "workstation."

The point is clear: First-tier companies that sell to big business will sell workstations for connectivity to larger systems. Second-tier firms will market plain-vanilla PCs via dealers to small business.

The shift is subtle but important. IBM and its major competitors have finally followed up on the promise they made long ago — that when the personal computer industry becomes truly commoditized, they will abandon that end of the market. Instead, they'll participate in the smaller, more lucrative corporate market.

The winners here are those corporate users who will find themselves presented with increasingly sophisticated hardware and software technology that really fits into their computing environments.

Depke is editor of "IBM Watch," a biweekly newsletter published by IDC Communications, Inc.

PC monitor sports larger display

Workstation-like graphics enhance desktop publishing

The Turbovision full-page display monitor from Irvine, Calif.-based AST Research, Inc. introduced at Comdex/Spring 1987 garnered a great deal of interest from attendees.

But the Turbovision offering has not been the only product to grab the monitor spotlight.

Two years ago, such a machine raised the eyebrows and hopes of desktop publishing users. Today, that monitor is just one of the pack.

There are at least 17 full-page display monitors, according to Ed Wong, a senior analyst for San Jose, Calif.-based research firm Dataquest, Inc.

Some monitors work with IBM Personal Computers and compatibles; others work with Apple Computer, Inc. Macintosh systems.

Ranging from $1,000 to $5,000, these monitors come in monochrome and color. The resolution of this new breed of monitor can range from a minimum of 600 to 1,600 pixels at the high end. Some monitors reportedly even have the ability to display two pages at a time.

AST's Turbovision, which works with the IBM PC, Personal Computer XT and AT and compatibles, falls in the mid-range in terms of price and functionality.

Retailing for $1,995, the Turbovision 15-in. monochrome monitor features a full 8½- by 11-in. page display with a 1,024-pixel by 1,280-line resolution.

A graphics boost

Also part of the Turbovision package is a graphics board that incorporates the Texas Instruments, Inc. 34010 graphics engine. This board reportedly boosts performance by off-loading graphics from the host CPU.

While there a number of monitors that compete with AST's Turbovision, there is a great demand for these products, Dataquest's Wong says. "Large display monitors really help productivity in publishing systems," he says.

Two years ago, users who published on PCs only had standard PC monitors, he recalls.

If these users wanted a larger display, they had to move to 32-bit technical workstations with large graphics displays. "Today, the lines between PCs and workstations are diminishing as larger, high-resolution displays are made available," Wong concludes. — REBECCA HURST

Circle Reader Service Number 137

Tech Talk

Continued from page 37

The PS/2 wasn't the only machine to receive a little attention from the software folks. The Apple Computer, Inc. Macintosh II and Macintosh SE are also gaining their share of fans. It's my personal conviction that the PS/2 may actually create the Macintosh aftermarket, as board makers turn to Apple's public domain Nu-bus as an alternative to the Micro Channel architecture and software developers discover the open version of the Mac interface.

For instance, Digital Communications Associates, Inc. in Alpharetta, Ga., was at the show with several products, including Macirma software for the Macintosh. There are two Macirma versions — one for the Mac SE and one for the Mac II — that allow an Apple machine to perform IBM 3270 emulation to gain access to IBM mainframes. Macirma will reportedly ship sometime this fall and will cost $1,195.

If there was a message to Comdex, it was that nothing is settled yet. The PS/2 did not blow the rest of the industry out of the water and neither has the industry snubbed the PS/2 and crowned Compaq or another vendor the new king of standards. Instead, people are covering their bases. Vendors are bringing out products for the PS/2, but they are also happy to support Microsoft Corp. MS-DOS or IBM PC-DOS and Apple machines.

Disk conversion

Continued from page 37

"We haven't been able to run IBM single-sided disks yet, and we don't know why," Chevalier admitted. "But our engineers are working on it."

Flagstaff will try and get a jump on the data conversion competition, which, Chevalier reported, only consists of IBM at this point. Lacking the huge direct sales force and distribution channels of IBM and others, Chevalier said he is sure the double whammy of Edapt price and availability will bring in the customers.

And if those incentives are not enough, the burden caused by the general awkwardness of the IBM disk conversion system will lure its share of business to Edapt'a corner, he claimed. "We're looking for those people who don't follow IBM blindly and pay the extra money," Chevalier said. — STAN KOLODNEY

Circle Reader Service Number 138

PRODUCT CHECKLIST

Prime Computer, Inc. has introduced the **Prime EXL 316 supermicrocomputer.**

The Prime EXL 316 is a Intel Corp. 80386-based microcomputer that uses Locus Computing Corp.'s Merge 386 to simultaneously run AT&T Unix System V.3 and Microsoft Corp. MS-DOS.

A standard configuration of EXL 316 includes Prime's implementation of Unix V.3, 2M bytes of memory, a 90M-byte formatted disk, a 60M-byte streaming tape backup subsystem and 10 asynchronous lines. It costs $23,900.

Prime Computer, Prime Park, Natick, Mass. 01760.

Circle Reader Service Number 139

Digital Equipment Corp. has introduced the **IBM PC Network Integration package.**

The product enables users of IBM Personal Computers, Personal Computer XTs and ATs to participate in local-area networks using DEC's previously announced VAX/VMS Services for Microsoft Corp. MS-DOS software.

VAX/VMS Services for MS-DOS is software that enables DEC VAX, Microvax or Vaxmate computers to act as application, data and resource servers to groups of Vaxmates, XTs or ATs.

The IBM PC Network Integration Package is priced at $895.

DEC, Maynard, Mass. 01754.

Circle Reader Service Number 140

Wang Laboratories, Inc. has introduced the **Professional Computer 280 and Professional Computer 380.**

The two IBM Personal Computer AT compatibles are based on Intel Corp. 80286 and 80386 processors, respectively. Both the 280 and 380 are bundled with the Microsoft Corp. MS-DOS 3.2 operating system.

The Professional Computer 280 comes with 640K bytes of random-access memory (RAM). The Professional Computer 380 has 2.5M bytes of RAM. Both systems can expand up to 10.5M bytes through memory option cards that are compatible with the Lotus/Intel/Microsoft Enhanced Memory Specification.

A base configuration for the Professional Computer 280 is priced at $3,850;

Wang's *Professional Computer 280*

a base configuration for the Professional Computer 380 starts at $6,495.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Circle Reader Service Number 141

NCR Corp. has announced the **PC916, a 32-bit personal computer** based on the Intel Corp. 80386 processor.

The PC916 supports 268M bytes of physical memory and 4G bytes of virtual memory. NCR said it currently offers 2M-byte expansion boards. The PC916 also accepts a combination of integrated 5¼-in. and 3½-in. floppy disk drives.

The basic PC916 configuration is priced at $6,353.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Circle Reader Service Number 142

Microsoft Corp. has rolled out the **Microsoft Basic Compiler.**

The Microsoft Basic Compiler was designed for personal computers running the Microsoft Xenix System V/286 operating system.

It allows programs written in the Microsoft MS-DOS version of Microsoft Basic and the company's GW-Basic Compiler as well as those written in Microsoft Basic Interpreter for the Xenix environment to be compiled with little or no modification, the company said.

The Microsoft Basic Compiler costs $695.

Microsoft, Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Circle Reader Service Number 143

PC's Limited has announced its **386^{16} personal computer.**

PC's Limited 386^{16}, based on Intel Corp.'s 80386 processor, was designed to serve as a workstation, multiuser host computer or network file server. It has 1M byte of pure static random-access memory for zero-wait-state operation and a 1.2M-byte 5¼-in. floppy disk drive.

Pricing for the PC's Limited 386^{16} ranges from $4,499 for a system with a 40M-byte hard drive and monochrome monitor to $6,499 for a model with a 150M-byte hard drive and enhanced graphics adapter color monitor.

PC's Limited, Building 3, 1161 Headway Circle, Austin, Texas 78754.

Circle Reader Service Number 144

CALENDAR

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Introduction to Telecommunications Systems: Technologies and Applications. Seattle, August 17-18 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Software Futures: An Executive Forum. Boston, August 17-18 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

National Computer Graphics Association CAD/CAM '87. Boston, August 17-20 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Network Planning and Design with New Technology. San Francisco, August 19-21 — Contact: Network Career Advancement Institute, 202 Fashion Lane #113, Tustin, Calif. 92680.

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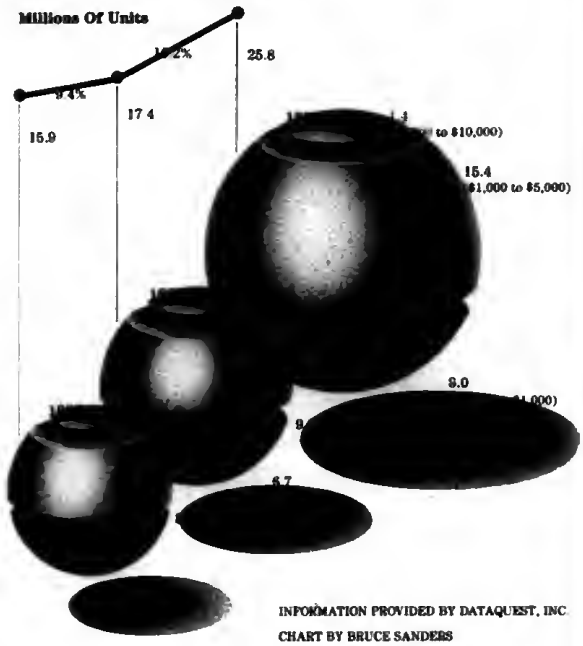

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next issue

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Hurry up and wait

Thomas Roberts

There's been a lot of hullabaloo about IBM and Microsoft Corp.'s forthcoming operating system, OS/2. Users of IBM Personal Computer AT systems have been waiting since August 1984 for a protected-mode successor to IBM PC-DOS. Don't kid yourself, though. OS/2 and its applications won't be available until the middle of 1988 at the earliest. But application development kits for OS/2 have been out for several months, and the prospect of a protected-mode operating system is no longer just vaporware.

Mixed in with the hue and cry about OS/2, however, is the rumble of dissent from a more idealistic band of PC users and software developers. These people are Intel Corp. 80386 technology junkies, believers in the idea that 386-based PCs will soon be the standard personal computing platform for business users.

Some 386 disciples even wish that Microsoft had skipped its Intel 80286-based system altogether and had tailored its next operating system specifically for the 386. Of course, that didn't happen. OS/2 is a 16-bit operating system written for the protected-mode of the 80286. OS/2 will run on 386-based systems in "286 emulation mode," but it will leave untapped some essential benefits of the more powerful 32-bit chip.

At some point in the future, there will be a 32-bit implementation of OS/2 — an OS/3, if you will. Exactly when this software will appear, however, is open to debate. Microsoft Chairman Bill Gates has implied that an OS/3 will be available a year or two after OS/2 makes its way to market.

Anyone who puts much stock in that kind of timetable for a Microsoft 386 operating system has a problem with long-term memory loss. If you remember when the first PC ATs were making their way into end users' hands, the air was filled with promises of a Microsoft operating system for the 80286. Back then, no one considered that the wait for OS/2 would eventually take three and a half years.

By now, we should know better. It will take on the order of three to five years before an OS/3 will make its way to market. There are two reasons for this delay.

First, the installed base of 386 systems will, for several years, be minuscule in comparison with the machines capable of running OS/2. It will take time for a viable OS/3 market to develop.

Second, Microsoft is betting heavily on OS/2's success and will do little to jeopardize its chances. Introducing another operating system on the heels of OS/2 would harm OS/2 by placing another set of choices before end users and application developers.

The moral is this: Those 386 users with an urge to get the most out of their systems should look to Unix or alternative operating systems. Waiting for a 32-bit operating system from Microsoft will bring little more than frustration.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.

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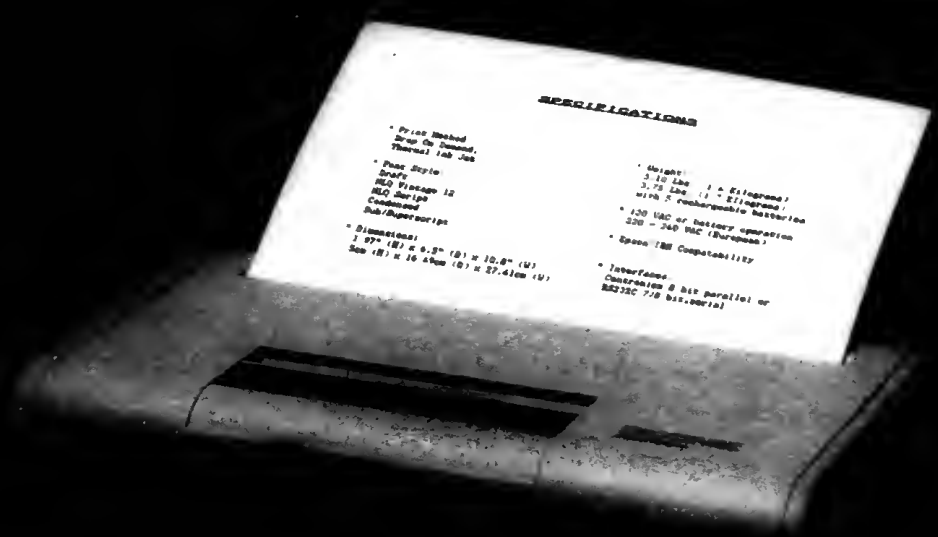

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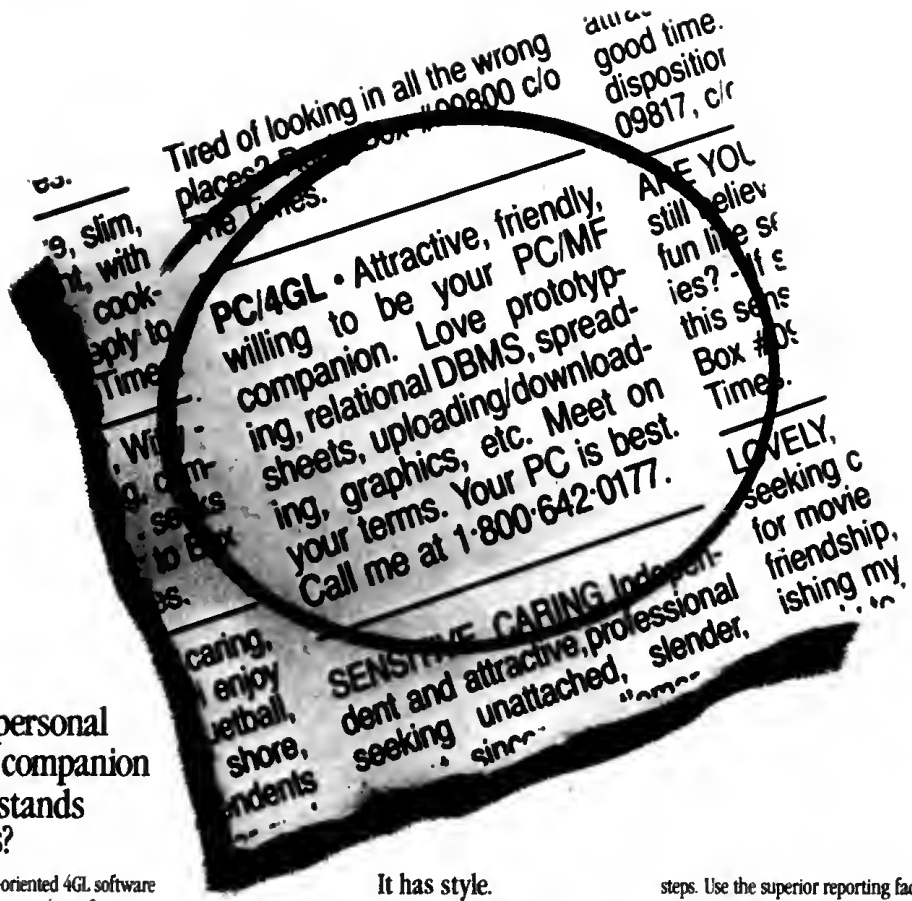

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